STRESS AND STRESS RESISTANCE RESOURCES AMONG MALE DENTISTS

By

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Elizabeth Cline Klement

This dissertation would not
have been possible if
not for my husband

THOMAS V. KLEMENT, D.M.D.

to whom I dedicate this work

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TABLE OF CONTENTS

		Page
ACKNOWLEDGEMENTS		iv
LIST OF TABLES		x
ABSTRACT		xi
CHAPTERS		
I	INTRODUCTION	1
	Statement of the Problem	5
	Purpose of the Study	8
	Need for the Study	9
	Significance of the Study	11
	Definition of Terms	12
	Organization of the Study	15
II	REVIEW OF THE LITERATURE	16
	Stress	16
	Historical Overview	16
	Theoretical Models of Stress	21
	Measurement Techniques	28
	Stress in Dentistry	33
	Stressors in the Practice of Dentistry	34
	Stress Response in Dentists	39
	Satisfaction	43
	Theories of Satisfaction	44
	Career Satisfaction of Dentists	48
	Mediator Variables in the Stress Process	54
	Hardiness	55
	Coping	67
	Social Support	77
	Health Practices and Exercise	86
	Health practices	87
	Exercise	90
	Summary	92
III	METHODOLOGY	94
	Research Questions	94
	Population and Sample	95
	Instruments	97
	The Strain Questionnaire	97
	The Dental Career Satisfaction Index	100

Page

The Index of Well-Being..... 101
The Dental Stress Inventory..... 102
The Hardiness Test..... 103
Coping Responses..... 105
The Vulnerability Scale of the Stress Audit. 107
Demographic Questionnaire..... 109
Data Collection..... 109
Data Analysis..... 110
Limitations of the Study..... 111

IV RESULTS AND DISCUSSION..... 113

Results..... 113
Research Question One..... 113
Research Question Two..... 118
Research Question Three..... 126
Research Question Four..... 129
Career satisfaction..... 129
Life satisfaction..... 131
Intercorrelations..... 133
Research Question Five..... 135
Strain..... 135
Career satisfaction..... 136
Life satisfaction..... 138
Discussion..... 140

V CONCLUSIONS, IMPLICATIONS, SUMMARY, AND RECOMMENDATIONS..... 151

Conclusions..... 151
Implications..... 153
Summary..... 155
Recommendations for Future Research..... 157

APPENDICES

A INSTRUMENTS..... 160

B COVER LETTERS FOR SURVEY QUESTIONNAIRE..... 167

REFERENCES..... 170

BIOGRAPHICAL SKETCH..... 187

LIST OF TABLES

Table		Page
1	Frequency and Relative Frequency Distributions of Demographic Variables	115
2	Means and Standard Deviations of Predictor and Criterion Variables	117
3	Analyses of Variance of Frequency of Staff Meetings on Other Variables	124
4	Analyses of Variance of Role of Spouse in the Practice on Other Variables	125
5	Stepwise Regression Analysis of the Relationship Between Strain and the Predictor Variables	128
6	Stepwise Regression Analysis of the Relationship Between Career Satisfaction and the Predictor Variables	130
7	Stepwise Regression Analysis of the Relationship Between Life Satisfaction and the Predictor Variables	132
8	Correlation Matrix Intercorrelations Among All Continuous Predictor and Criterion Variables	134
9	Simple Linear Regression Analysis of the Relationship Between Stressors With the Mediating Variables and Strain	137
10	Simple Linear Regression Analysis of the Relationship Between Stressors With the Mediating Variables and Career Satisfaction	139
11	Simple Linear Regression Analysis of the Relationship Between Stressors With the Mediating Variables and Life Satisfaction	141

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STRESS AND STRESS RESISTANCE RESOURCES AMONG MALE DENTISTS

by

Elizabeth Cline Klement

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Chairman: Roderick J. McDavis
Major Department: Counselor Education

The purpose of this study was to describe stress and the role of stress resistance resources in male dentists. Specifically, using the transactional model of stress, the relative effects of hardiness, coping style, social support, and health practices in the stressors-strain/satisfaction relationship in male dentists were explored. The sample included 251 male dentists actively involved in practice, randomly selected from the membership list of the Florida Dental Association. Participants completed questionnaires assessing their levels of strain, career satisfaction, life satisfaction, stressors, hardiness, coping styles, social support, health practices, and demographic characteristics.

One finding of this study was that the participants reported moderate levels of stressors, strain, hardiness, career satisfaction, moderate to high levels of social support, health practices, and life satisfaction. They also used predominantly effective coping styles. Another finding of this study was that differences existed among dentists on

certain demographic variables (years in practice, role of spouse, days of continuing education, frequency of staff meetings, type of practice, religious preference, income, and marital status) and the other measures. A third finding was that strain was positively predicted by stressors and avoidance coping and negatively predicted by hardiness, social support, and role of the spouse. A fourth finding was that career satisfaction was positively predicted by income, frequency of staff meetings, active-behavioral coping, and hardiness, and negatively predicted by religious preference. By contrast, life satisfaction was positively predicted by hardiness, social support, health practices, and role of the spouse, and negatively predicted by stressors. A fifth finding was that hardiness, avoidance coping, and stressors was the optimum subset of predictors for strain in male dentists. Hardiness, social support, and health practices served as mediators in the stressors-life satisfaction relationship among male dentists.

CHAPTER I
INTRODUCTION

> Nowadays, everyone seems to be talking about stress. You hear about this topic not only in daily conversation but also on television, via radio, in the newspapers, and in the ever increasing number of conferences, centers, and university courses devoted to stress. Yet remarkably few people define the concept in the same way or even bother to attempt a clearcut definition. The businessperson thinks of stress as frustration or emotional tension; the air traffic controller, as a problem in concentration; the biochemist and endocrinologist, as a purely chemical event; and the athlete, as muscular tension. This list could be extended to almost every human experience or activity, and, somewhat surprisingly, most people--be they chartered accountants, short-order cooks, [dentists,] or surgeons--consider their own occupation the most stressful. Similarly, most commentators believe that ours is the "age of stress," forgetting that the caveman's fear of attack by wild animals or of death from hunger, cold, or exhaustion must have been just as stressful as our fear of a world war, the crash of the stock exchange, or overpopulation. (Selye, 1985, p. 17)

There are many reasons dentists experience stress. The training dentists receive is competitive and long, and the long-term process of establishing and maintaining a dental practice is demanding. Dentists often work long hours, with anxious and fearful patients, who may have a poor public image of dentists (O'Shea, Corah, & Ayer, 1984). Dentists also typically work independently and perhaps without the

benefit of professional social support that other occupations enjoy. Since "stress is a threat to the quality of life, and to physical and psychological well-being" (Cox, 1978, p. v), dentists are a population at risk. Frequently cited (albeit controversial) statistics confirm that dentists have a higher than average rate of physical and psychological symptoms that are considered the outcomes of high stress. Some of these outcomes include coronary heart disease (Russek, 1962), suicide (Blachly, Osterud, & Josslin, 1963), divorce, alcoholism, and drug abuse (Clarno, 1986).

The effect of occupational stress in the development of physical and mental illness is well established (Calhoun & Calhoun, 1980). The National Institute for Occupational Safety and Health (NIOSH) studied the relative incidence of mental health disorders in 130 occupational categories (Colligan, Smith, & Hurrell, 1977). The study revealed that seven of the top 27 occupations were in the health care field. A recent researcher on high stress occupational groups, however, did not find such a clear cut link between stress and decreased physical and mental health (Kobasa, 1979, 1982).

Stress researchers have examined occupational groups identified to be at high risk to the damaging effects of stress; these occupations include the traditionally male occupations of business executives (Kobasa, 1979), military officers (Kobasa, 1980), lawyers (Kobasa, 1982), air traffic

controllers (Rose, Jenkins, & Hurst, 1978), university administrators (Orpen & King, 1986), commercial airline pilots (Sloan & Cooper, 1986), and dentists (Katz, 1987). General findings indicated that while these individuals did experience a great deal of job stress, not all of them showed the physical and psychological symptoms thought to be the outcomes of stress. Apparently there are differences in the ways that individuals respond to stress. Some individuals become ill while others show no debilitating signs of stress and may actually thrive under stress (Kobasa, 1979).

These differences can be explained through the transactional model of stress which maintains that stress resides neither in the situation nor in the person but in the transaction between the environment (situation) and the person. The stress response is experienced by the person as a result of a stressful transaction between the person and the environment (Matheny, Aycock, Pugh, Curlette, & Cannella, 1986).

The stress process begins with demands made on the person. According to Lazarus (1966, 1981), the principal spokesman for these transactional approaches, demands or events calling for adaptation on the part of the person lead to two forms of cognitive appraisal: primary appraisal of the seriousness of the demands and secondary appraisal of the adequacy of one's resources and options for meeting the demands. Individual differences in reacting to demands

result not only from characteristic ways of appraising demands and resources but also from the individual's habitual style of relating to events and structuring life (Matheny et al., 1986).

The transactional model of stress represents a turn away from traditional stress research in which stress scores and illness indicators were measured and correlated. This model also signifies serious consideration of individual differences as well as the optimistic view that some people do remain healthy (Rabkin & Struening, 1976).

Hence, researchers have proposed the idea that there are moderator or mediating variables (Antonovsky, 1979; Johnson & Sarason, 1979) or resistance resources that mediate the connection between the occurrence of stressful life events and the onset of physical and psychological symptoms. As Johnson and Sarason (1978), Kobasa (1979), and other investigators have shown, many persons are not debilitated even though they live quite stressful lives. Stress resistance has been associated with a wide variety of resources including personality characteristics such as hardiness (Kobasa, 1979), coping styles (Lazarus & Folkman, 1984; Pearlin & Schooler, 1978), perceived social support (Billings & Moos, 1981; Cobb, 1976; Schaefer, Coyne, & Lazarus, 1981; Thoits, 1986), health practices (Wiebe & McCallum, 1986), and exercise (Kobasa, Maddi, & Puccetti, 1982).

Statement of the Problem

Although the concept of stress resistance resources is relatively new, there is initial empirical support documenting the importance of mediating or moderator variables in the stress-illness relationship. Kobasa (1979) studied the personality factor of hardiness--characterized by commitment, control, and challenge--as a conditioner of the effects of stressful life events on illness onset in male business executives and lawyers (Kobasa, 1982). Results in both studies indicated individuals high in hardiness remained healthy under high stress while individuals low in hardiness did not remain healthy.

Other researchers have investigated the effects of hardiness in combination with other mediating variables, such as exercise (Kobasa, Maddi, & Puccetti, 1982), social support (Kobasa & Puccetti, 1983), health practices (Wiebe & McCallum, 1986), and social support and exercise (Kobasa, 1982). Katz (1987) found that hardiness was far more predictive of both stress and career satisfaction in dentists than were any of the situational factors inherent within the practice of dentistry. Another investigator examined the relationships between stress and satisfaction levels and hardiness, social support, and coping strategies in academic multiple-role persons (Hammond, 1987).

Coping style, the way a person actually copes with one or more stressful events, is another mediating variable. Pearlin and Schooler (1978) studied the effects of coping

and personality characteristics on psychological symptoms in 2300 Chicago adults. Results indicated the effective coping modes are unequally distributed in society, with men, the educated, and the affluent making greater use of the most effective coping styles. Billings and Moos (1984) found that coping and social resources did not mediate the stress-psychological symptoms relationship in a large group of clinically depressed patients.

Social support has been the most frequently researched mediating variable and yet the results are inconsistent as to whether it mediates, or serves as a buffer between, stressful events and psychological distress. Several studies have found that social support is significantly negatively correlated with psychiatric symptoms (Eaton, 1978; Lin, Ensel, Simeone, & Kuo, 1979; Wilcox, 1981). LaRocco, House, and French (1980) found that social support did buffer stress and mental/physical health in a large group of men from 23 occupations; however, it did not buffer the relationship between stress and job dissatisfaction. The opposing view is reflected by data gathered from a middle-aged sample, which did not find that social support was beneficial because it mediated the effects of stressful events (Schaefer et al., 1981).

There are also apparent differences in the importance of social support as a stress resistance resource in men and women. Holahan and Moos (1985) and Hammond (1978) found social support from family did buffer the negative health

effects of life stress in women, but that it did not function as a stress resistance factor for men. Instead the work environment appears to be a more important source of support for men (Holahan & Moos, 1982; Kobasa & Puccetti, 1983).

Wellness factors such as health practices and exercise also have been proposed as mediating variables, although less frequently than the others. Kobasa (1982) found that exercise and social support did not significantly affect the degree of strain reported in lawyers. Yet, in another study, executives high in both hardiness and exercise remained more healthy than those high in one or the other (Kobasa, Maddi, & Puccetti, 1982). Wiebe and McCallum (1986) found that hardy college students may be more healthy because they maintained better health practices while experiencing stress than did nonhardy individuals.

In spite of the fact that numerous articles have appeared in the dental literature regarding the stressors experienced by dentists, few have been based on empirical research. Only one researcher has examined the effects of any mediator variable on the stress-illness relationship in dentists. Katz (1987) found hardiness to be significantly related to lower levels of stress and psychiatric symptoms and higher levels of career satisfaction experienced by dentists.

The dental profession has increasingly been identified as highly stressed. Many articles have appeared in recent

years in both professional and lay public literature about the stress of dentistry and the purported inordinately high incidence of suicide, coronary heart disease, alcohol and drug abuse, divorce, depression, and other problems presumed to be stress related among dentists (Howard, Cunningham, Rechnitzer, & Goode, 1978; Katz, 1978). However, recent evidence indicates that the case of high suicide rates among dentists may have been overstated (Temple University, 1976).

Yet the frequency of articles, books, continuing education courses, and professional meeting presentations on the topic of stress among dentists reflects that the profession as a whole perceives its members to be highly stressed in their work settings. Even if dentists do not differ from others in the incidence of stress related problems, the belief that they do has at least reached the level of widely accepted folklore with the profession and, to an increasing extent, with the general public.

Purpose of the Study

The purpose of this study was to describe stress and the role of stress resistance resources in male dentists. Specifically, using the transactional model of stress, the relative mediating effects of hardiness, coping style, social support, and health practices in the stressors-strain/satisfaction relationship in male dentists were explored in this study.

Need for the Study

While much has been written about the apparent stress of dentists, actual empirical research is scant. The few statistically based studies that have been conducted suffer from serious shortcomings in both methodology and theoretical conceptualization (Howard et al., 1976; O'Shea et al., 1984). To date there has been only one researcher (Katz, 1987) who interpreted data within a theoretical model of stress as a transaction between the person and the environment.

Most of the articles in the professional and lay press which promote the image of dentistry as a highly stressed occupation often refer to the "fact" that dentists have the highest suicide rate of all professionals. The data for this "fact" come from an Oregon study (Blachly et al., 1963). The finding indicated that from 1950 to 1956 dentists' suicide rate was higher, by about six times, than that of the average white male population of Oregon (and the highest of all professions included in the study). However, in the succeeding five years, 1957 to 1961 (years not included in the study), dentists' suicide rate was about twice that of the general population and about the equivalent of physicians' and attorneys' rates.

Ayer and Moretti (1985) stated that dentistry may not be as stressful as the public has been led to believe. They referred to strong, though indirect, evidence such as socioeconomic status and degree of control as reasons why

dentists are not as vulnerable to the negative aspects of stress as other groups. Money can buy many resources, including time and opportunities for exercise and vacations, all of which may mediate the effects of stress. The extent to which one has control or perceives oneself to have control over potentially negative stressors appears to reduce the adverse consequences of such stressors. These authors proposed that dentists have learned or have available to them relatively appropriate and effective means for dealing with stressors. This concept, however, seemingly based in the transactional model of stress which views stress as the interaction between the person and the environment, needs to be empirically tested in a group of practicing dentists.

Before successful intervention approaches can be developed to help dentists deal with their professional stressors, basic research must be conducted to determine the degree to which dental practitioners perceive themselves as stressed in their occupational roles. In addition, an attempt should be made to systematically identify and determine the relative contribution of the factors contributing to dentists' strain and satisfaction.

The transactional model of stress (Lazarus & Folkman, 1984) has been studied in a limited manner with samples of adults aged 35 to 45 and 45 to 65. Several of the mediating variables included in the transactional model have been studied individually (or in pairs) to investigate their independent effects on outcomes such as stress and mental

health. Empirical research does provide evidence about the mediating effects of such stress resistance resources as personality characteristics, coping styles, social support, health practices, and exercise.

There have been, however, no studies that have adequately investigated the effects of each of these mediating variables in the same study. In only one study has stress and accompanying satisfaction experienced by dentists been investigated (Katz, 1987). Clearly, there is a need to explore the effects of multiple moderator variables and to investigate the applicability of the transactional model of stress with a broader population.

Significance of the Study

Information about stress and satisfaction in dentists and the joint mediating roles of hardiness, coping styles, social support, and health practices has significance in a number of areas. In the area of theory, the results of this study will have implications for the transactional theory of stress by investigating the joint effects of multiple moderator variables. In the area of research, the results of the study will make a significant contribution to the dental literature as well as the stress literature.

The results of the study will have far-reaching implications for the selection and training of dental students as well as the development of proactive intervention strategies with practitioners currently in the

field. Finally, the results of this study will provide information for counselors who are concerned with such matters as person-environment fit, and personal growth and wellness (Matheny et al., 1986). If dentists experience high levels of stress or low levels of satisfaction, some of them are likely to seek the help of counselors. If counselors are knowledgeable about stress and satisfaction in dentists and the relative importance of mediators such as hardiness, coping styles, social support, and health practices, they may be better prepared to help dentists as well as others in high-stress occupations.

Definition of Terms

A number of terms will be used throughout this study and thus require further elaboration and definition.

Career satisfaction is an individual's attitude toward one's present career, essentially comprised of feelings of being actualized (having a good fit between career and ability and interests) and feelings of being successful (Osherson & Dill, 1983).

Cognitive appraisal denotes the way people construe the significance of encounters for their well-being, that is, as irrelevant, benign, harmful, threatening, or challenging. The latter three are forms of stress appraisal (Lazarus & DeLongis, 1983).

Coping describes the constantly changing cognitive and behavioral efforts to manage specific external and/or

internal demands that are appraised as taxing or exceeding the resources of the person (Lazarus & Folkman, 1984, p. 141).

Coping style is a person's general propensity to deal with stressful events in a particular way. Specifically, it is cognitive and behavioral reactions that are performed to reduce or eliminate psychological distress or stressful conditions (Billings & Moos, 1981).

Dentists in this study are men actively involved in the practice of dentistry and who are also members of the Florida Dental Association.

Hardiness describes a constellation of three personality characteristics that function as a resistance resource in the encounter with stressful life events, including (a) an ability to feel deeply involved in or committed to the activities of their lives, (b) the belief that one can control or influence the events of their experience, and (c) the anticipation of change as an exciting challenge to further development (Kobasa, 1979).

Health practices refer to a variety of positive and negative behaviors related to dietary practices, hygienic practices, recklessness, substance abuse, and exercise (Wiebe & McCallum, 1986).

Life satisfaction denotes people's assessment of the nature and quality of their life experiences as a whole, as viewed at the present time and as measured by the Index of Well-Being (Campbell, Converse, & Rodgers, 1976).

Mediating variables are variables that mediate or moderate the connection between stress on an individual and the onset of physical and psychological symptoms (Johnson & Sarason, 1979). In this study, hardiness, coping style, social support, and health practices will be investigated as mediating variables.

Satisfaction is the affective orientation on the part of people toward roles they are presently occupying (Vroom, 1964).

Social support describes the extent to which individuals believe that their needs and resources for support, information, and feedback are fulfilled (Procidano & Heller, 1983).

Strain is the psychological or physical consequences associated with stress, often referred to as the stress response. In this study, strain is defined as a syndrome of physical, behavioral, and cognitive symptoms that are elicited, to varying degrees, by environmental demands upon the individual (Lefebvre & Sandford, 1985).

Stress denotes the particular relationship between people and the environment that is appraised by people as taxing or exceeding their resources and endangering their well-being (Lazarus & Folkman, 1984, p. 19).

Stressors are the demands made on the person from various sources, either self-generated or from the environment, which are cognitively appraised by the person

as unequal to resources and viewed as a stressor (Matheny et al., 1986).

Organization of the Study

Chapter II contains a review and analysis of the related literature on stress, stress in dentistry, satisfaction, and mediating variables in the stress process, specifically hardiness, coping style, social support, and health practices. Chapter III includes a description of the methodology of the study, including the research questions, a description of the population and sample, the instruments, the data collection procedures, the data analysis, and the limitations of the study. In Chapter IV the results and a discussion of the results are presented. Chapter V includes the conclusions, implications of the study, summary, and recommendations for future research.

CHAPTER II
REVIEW OF THE LITERATURE

In this chapter, a review and synthesis of the literature relevant to the areas of stress, stress in dentistry, satisfaction, and stress mediating variables are presented.

Stress

Pioneer stress researcher Hans Selye stated that "stress is a scientific concept which suffers from the mixed blessing of being too well known and too little understood" (Selye, 1980, p. 127). Although stress is a difficult concept to define, much research has been directed at understanding the various phenomena associated with it. This section includes a historical overview of the stress concept; theoretical models of stress also are reviewed, along with measurement techniques.

Historical Overview

Before turning to contemporary science, it is useful to review some of the perspectives that laid the foundation for the current theories of stress. Scientific interest in stress in the biobehavioral sciences has developed from

several disciplines, including physiology, endocrinology, medicine, sociology, anthropology, and psychology. However, there are two basic traditions in which research has thrived. One has evolved from the biological perspective, based on research in physiology and endocrinology. The other is based on a psychosocial tradition. Each has made important contributions to the understanding of stress (Fleming, Baum, & Singer, 1984).

The biological tradition has its roots in the medical interest in stress, which can be traced back to Hippocrates in ancient Greece (Selye, 1985). Physicians in the 19th and 20th centuries hypothesized that stress and strain could lead to physical illnesses. In 1910, Sir William Osler (cited in Feuerstein et al., 1986) observed that the lifestyle of certain businessmen resulted in significant strain and predisposed them to angina pectoris. Later the great American physiologist Walter Cannon made one of the earliest contributions to stress research. Cannon (1932) used the term stress to describe his research on the fight-or-flight response, that when an organism perceives a threat, the body is rapidly aroused and motivated through the sympathetic nervous system and the endocrine system. There is a concerted physiological response which mobilizes the organism to attack the threat or to flee; hence, it is called the fight-or-flight response. In Cannon's (1936) work on emotional stress, he concluded that stress can be

harmful because it disrupts emotional and physiological functioning and can cause medical problems over time.

Though Cannon's (1936) work is very important in understanding stress, work by Selye (1956, 1976) reflects the primary popular view of stress research in the biological community. Although Selye (1936) initially explored the effects of sex hormones on physiological functioning, he became interested in the stressful impact of his interventions. Accordingly, Selye exposed laboratory animals to a variety of prolonged stressors--such as extreme cold and fatigue--and observed their physiological responses. To Selye's surprise, all stressors, regardless of type, produced essentially the same pattern of physiological responding.

From these observations, Selye (1956) proposed the general adaptation syndrome (GAS) theory, a three-stage process that describes how stress affects the organism. The first stage of the process is alarm, in which the organism is mobilized to combat the physical demands of the stressor. The second stage is resistance, in which the organism appears to hold its own against the still present threat. The third stage is exhaustion, which occurs if the organism fails to overcome the threat and depletes its physiological resources in the process of trying. The organism seemingly gives up, and the collapse may result in death. Presumably this only occurs when the threats persist or repeat often

enough to overwhelm the organism's ability to resist (Fleming et al., 1984).

The substantial impact of Selye's work on the field of stress continues to be felt today. The Selye model remains a cornerstone of the field of stress. One reason is that it offers a general theory of stress (Selye, 1976) with several important implications. First, the implication of this theory is that the effects of stress are cumulative. That is, the damage produced by stressors accumulates over time. Second, Selye proposed that repeated or prolonged exhaustion of resources, the third stage of the syndrome, was responsible for the physiological damage that laid the groundwork for disease. In fact, prolonged or repeated stress has been implicated in disorders such as cardiovascular disease, arthritis, hypertension, and immune-related deficiencies (Taylor, 1986).

In addition to the biological tradition, there is a psychosocial perspective on the study of stress (Fleming et al., 1984). This perspective has generated a stream of research that is usually independent of physiological studies. In this view, stress is the reaction of an organism to demands placed upon it. The key focus within this rather broad perspective is upon healthy, usually normal humans and nonphysical stressors. The emphasis is on the interaction of stressful agents and the human system of appraisal and evaluation (Lazarus, 1966). This view suggests that no events are universally stressful. Stress

only exists when the person undergoing it defines it as such.

A classic research example of this conception of stress is provided by Lazarus and colleagues (e.g., Lazarus, 1966; Speisman, Lazarus, Mordkoff, & Davison, 1964). College students viewed a film of aboriginal subincision rites (adult circumcision by means of stone-age tools). Before viewing the film, they were exposed to one of four experimental conditions. One group listened to an intellectual anthropological description of the rites. A second group heard a lecture that deemphasized the pain the initiates were experiencing and emphasized their excitement over the events. Another group heard a description that emphasized the pain and trauma that the initiates were undergoing. The fourth group heard no sound track.

Measures of autonomic arousal (heart rate, skin conductance) and self-reports suggested that the first two groups experienced considerably less stress than did the group whose attention was focused on the trauma and pain. The film stressor itself elicited no universal reaction. Thus, this study illustrates that stress was not only intrinsic to the film itself but also depended upon the viewer's appraisal of it.

Although there are several definitions of the stress concept, some commonalities emerge. Basically, the stress experience is comprised of two major components: stressors and stress response (Feuerstein et al., 1986). Stressors

represent stimulus events or demands requiring some form of adjustment or adaptation. Stressors usually evoke a typical set of responses, the stress response. The circular nature of this definition is intentional. It is believed that a complex feedback system exists between stressor and stress response, with each influencing the other.

At the most basic level, one cannot assume with certainty that a particular stimulus will result in a stress response for all individuals. Actually the stress-response-producing properties of a stimulus may also vary over time and situations for the same individual. At a broader level, these observations suggest that a number of factors can mediate or moderate the stressor-stress response interaction, thus determining the ultimate stress experience. These mediating factors are discussed in detail in a later section of this chapter.

Theoretical Models of Stress

Biobehavioral scientists have created several theories to try to link environmental phenomenon (stressors) with psychological or physical consequences (stress responses). Currently, there are three major theoretical models of stress: stimulus-based, response-based, and interactional or transactional. Stimulus models view stress as a psychosocial demand leading to personal strain (Holmes & Rahe, 1967; Shinn, Rosario, Morch, & Chestnut, 1984). Response models see it as a physiological response to

demands made on the person (Selye, 1956). Transactional models, on the other hand, see stress as an interaction between the person and the environment (Coyne & Lazarus, 1980; Lazarus, Kanner, & Folkman, 1980).

The general public usually thinks of stress according to a stimulus-based model, which essentially is based in engineering principles. In considering this engineering-oriented model, a useful analogy has been drawn with Hooke's Law of elasticity (as cited in Cox, 1978), which describes how loads produce deformation in metals. The main factors in Hooke's Law are that of "stress," the load (or demand) which is placed on the metal, and that of "strain," the deformation which results. The law states that if the strain produced by a given stress falls within the "elastic limit" of the material, when the stress is removed the material will simply return to its original condition. However, if the strain passes beyond the elastic limit then some permanent damage will result. This analogy suggests that just as physical systems have an elastic limit, people have some built-in resistance to stress. Up to a point stress can be tolerated, but when it becomes intolerable permanent damage, physiological and psychological may result. There appears to be great individual variation in resistance to stress, and levels which one finds easily tolerable may be completely intolerable to the next person.

Thus for stimulus-based models, stress is conceptualized in terms of the environment. The assumption is that

some environmental condition (the stimulus or stressor) has an impact on the person that produces strain. Clear examples of research using this theory are studies of stressful occupations (Rose, Jenkins, & Hurst, 1978) and life events research (Dohrenwend & Dohrenwend, 1974). The major task is to delineate the characteristics of stressful situations. Holmes and Rahe (1967) have identified and classified stressful life events, such as death of a spouse, divorce, change of job, vacation, etc., and attempted to determine the impact of these life events on individuals. This approach treats stress as the independent variable and postulates that stress in the form of clustering life events results in strain or tension which increases the risk of illness.

Response-based models emphasize the determination of a stress response which reflects a situation in which the person is under strain from a stressor (Feuerstein et al., 1986). Studies investigating this model view stress as a dependent variable. Selye's (1956) general adaptation syndrome (GAS) is an example of the response-based concept of stress.

Selye emphasized that stress is the person's response to the demands of the environment (Cox, 1978). The stress response is a nonspecific, universal pattern of defense responses that serves to protect and preserve the biological integrity of the person. Additionally, the stress response

although initially adaptive, if severe and prolonged may result in disease states. In this way, a decline in resistance to stress below normal levels is associated with the development of disease and physical trauma.

Both the stimulus-based and the response-based models of stress focus only on one aspect of the stress experience, either the stimulus or the response. The stimulus-based model has its major weaknesses in its failure to identify what is stressful about particular real-life situations and to explain individual differences (Cox, 1978). The response-based model assumes that any stimulus which produces the stress response must be viewed as a stressor. Thus, some activities and phenomena which are not generally considered stressors, such as exercise, emotions, and fatigue, would be labeled as such. Furthermore, no straightforward relationship between the various components of the stress response across all individuals and situations has been defined (McGrath, 1970). A more recent model, the transactional model, overcomes some of these problems.

Transactional models go beyond considering only stimulus and response aspects of stress. Stress is seen as an intervening variable between stimulus and response (Cox, 1978). The transactional model proposes that stress occurs through the relationship, or interaction, between the person and the environment. The term transaction has a quality missing in the concept of interaction. It is "that

transaction implies a newly created level of abstraction in which the separate person and environment elements are joined together to form a new relational meaning" (Lazarus & Folkman, 1984, p. 294). This approach takes into account characteristics of the person on the one hand and the nature of the environmental event on the other. Stress is viewed as the reflection of a lack of fit between the person and the environment. This view parallels the modern medical concept of illness, which is no longer seen as caused solely by an external organism. Whether or not illness occurs depends also on the individual's susceptability.

One version of the transactional model is proposed by Lazarus and colleagues (e.g., Coyne & Lazarus, 1980; Folkman, 1984; Folkman, Schaefer, & Lazarus, 1979; Lazarus, 1966; 1981; Lazarus & Folkman 1984; Lazarus & Launier, 1978). It is a cognitively oriented theory of psychological stress and coping in which the person and the environment are viewed as being dynamic and mutually reciprocal. Stress is conceptualized as a relationship between the person and the environment that is appraised by the person as taxing or exceeding one's resources and as endangering one's well-being. The theory identifies two processes, cognitive appraisal and use of coping strategies, as critical mediators of stressful person-environment relationships and their immediate and long-term outcomes. Cognitive appraisal is the process through which the person evaluates whether a

particular encounter with the environment is relevant to one's well-being and, if so, in what way.

Lazarus and Folkman (1984) propose two kinds of appraisal: primary and secondary. Primary appraisal involves the individual's determination of the situation as positive, irrelevant, or stressful. Stressful appraisals can take three forms: harm/loss, where the damage has already been done; threat, where there is potential for harm/loss; and challenge. Harm/loss and threat appraisals trigger negative emotions such as fear or anger, whereas challenge triggers positive emotions such as excitement or eagerness (Matheny et al., 1986). During this process the individual appraises the level of demand of the situation (Cox, 1978). Thus, demand is based on the person's perception of the environment. Demand may be external, coming from the environment (such as a work deadline), or internal, including psychological and physiological needs and expectations, such as the expectation that one can do everything well. In secondary appraisal, the individual assesses the resources available and what can be done about the situation.

Numerous factors influence the appraisal process, including factors relating to the situation, to the person, and to the coping strategies available (Lazarus & Folkman, 1984). Factors relating to the situation that affect appraisal include its novelty, predictability, timing, and ambiguity. Factors relating to the person, such as beliefs

about personal control, expectations of ability and outcome affect the appraisal process. Factors relating to coping strategies available to the person include problem solving skills, social skills, social support, and material resources. These factors all interact to influence how individuals appraise the situation and their ability to deal with it. The person's appraisal then influences the coping strategies tried. The individual continually reappraises the situation and possibilities as new information from the environment and from the person's own reactions are received. How the person copes is thought to have short-term and long-term consequences in terms of social functioning, morale and well-being, and somatic health.

The transactional model, as opposed to the stimulus-based and response-based models, has the strength of not focusing on either just the stressor or the stress response. Instead, it focuses on the interaction between the person and the environment. Furthermore, it allows for individual differences through the inclusion of perceptions of demands and resources. It also proposes mediating factors that help explain why all people under stress do not experience ill effects. Finally, it considers positive outcomes such as morale and well-being, rather than focusing only on negative outcomes such as psychological symptoms or physical illness. Thus, the transactional model seems best suited to use to aid in exploring the complex process of the relationship between stress and outcomes.

Measurement Techniques

Methods for studying stress vary in terms of type of setting, such as a laboratory or natural environment, and mode of measurement, such as physiological, behavioral, or cognitive (Feuerstein et al., 1986). This section illustrates several of the current techniques for measuring stress. First, the measurement of stressors is discussed, followed by the measurement of various aspects of the stress response.

Stressors are demands made on the individual. The represent stimulus events that require some form of adaptation or adjustment. Stressors can be external physical stimuli, such as cold, heat, loud noises, crowding, or interpersonal difficulties with a loved one, or internal stimuli, such as physical pain or cognitions including thoughts or feelings. Stressors can be both positive or negative; in fact, positive events may require as much adaptation or adjustment as negative events. Stressors also vary considerably across individuals, as well as across time and situations for the same individual.

Several research teams have worked to identify and scale stressors that are common to most people. The Social Readjustment Rating Scale (SRRS) and Schedule of Recent Experience (SRE) have been widely used measures of stressors (Holmes & Rahe, 1967). The SRRS ranks the stressfulness of major life changes that require adjustment or situations that disrupt daily living, such as death of a spouse or a

job promotion, while the SRE measures the frequency of these life changes in the last year. Numerous studies relating life events to subsequent physical illness have established moderate correlations ranging from .20 to .30 (Schroeder & Costa, 1984). Although study of the life events-illness relationship has been very popular in stress research; recently researchers have been critical of the major life event scales and many questions have been raised about methodological problems (Taylor, 1986).

In contrast to the work on major life events, Lazarus and his associates developed the Hassles and Uplifts Scales (Kanner, Coyne, Scahefer, & Lazarus, 1981) to assess the role of minor stressful events, both negative and positive, and their cumulative impact on health and illness. Hassles are the irritating, frustrating, distressing demands that characterize everyday transactions with the environment. They include annoying practical problems such as losing things or traffic jams and fortuitous occurrences such as inclement weather, as well as arguments, disappointments, and financial and family concerns. Uplifts are the pleasant events of everyday life that may buffer people against illness; such small joys as playing with one's child or enjoying a pleasant dinner with friends. Several studies have proved hassles to be a better predictor (than major life events) of psychological symptoms or physical health status major life events (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982; Kanner et al., 1981; Monroe, 1983). Thus, it

may ultimately emerge that it is the wear and tear of daily life that more reliably predicts illness and psychological well-being than more major but rare life events.

Another method of assessing stressors is the identification of specific groups of individuals commonly exposed to similar occupational stressors. This assessment has defined and quantified these occupational stressors. Two examples of this type of approach are the Nursing Stress Scale (Gray-Taft & Anderson, 1981) and the Dental Stress Index (Katz, 1981). The Nursing Stress Scale measures stressors nurses encounter in the performance of their duties, while the Dental Stress Index measures dentists' perceptions of stressors common to the practice of dentistry.

An assessment of the stress response can be made using physiological, behavioral, or cognitive measures. Currently there is more variety in types of measures for the stress response than for stressors. Part of the reason for this is that the stress response is often thought of as the dependent variable in studies and, therefore, must be measured (Feuerstein et al., 1986).

The physiological component of the stress response includes both psychophysiological and biochemical responses (Feuerstein et al., 1986). The electrical activity of muscle, heart rate, and blood pressure are widely used measures of psychophysiological responses to stress. Adrenocorticotropic hormone (ACTH), catecholamines, and

endorphins are some of the biochemical variables studied. Physiological measures of stress should not be used as the sole indicators of the stress response; they measure only one aspect of the stressor-stress response and may be sensitive to other factors as well. In addition to stressors, level of activity, sex, age, and weight can affect the physiological responses in humans.

In general, assessment of the behavioral component of the stress response includes both direct observations made by an experimenter and self-reports by the subject. There are two types of behavioral observational methods. The first includes recording specific behaviors such as facial expressions, movement, verbal responses, or rate of speech. The second method involves observation of performance in such areas as memory, attention, visual-motor skills, and problem-solving. Performance tasks are useful in that distress, activation, or arousal can affect a person's ability to perform by decreasing motivation, attention, or concentration which can determine the quality of performance before, during, and after exposure to stressors. Behavioral self-reports include questionnaires, rating scales or checklists used by the subject to indicate behavior that may not be observable in an experimental setting or to provide additional information on behavior. Activity schedules, sexual behavior questionnaires, or ratings of specific behaviors such as nail biting, frequency of urination, or avoidance of certain stressors are a few examples of

behavioral self-reports. Self-report measures are probably the most frequently used method of measuring the stress response in humans (Baum, Grunberg, & Singer, 1982).

The cognitive component of the stress response represents an important variable in several stress models. Cognitive assessment can refer to a wide variety of measures designed to measure thoughts, beliefs, attitudes, and mood, to name a few. It is important to emphasize that cognitive processes do not only represent components of the stress response, but also that they can actually influence the stress response (i.e., serve as mediating variables). This concept is especially relevant when considering the transactional model of stress. Measures of the cognitive components of the stress response are usually in the form of self-report questionnaires, checklists, or interviews.

Several models of stress emphasize the occurrence of multiple responses in reaction to a stressor. Therefore the use of multimodal measurement, including physiological, behavioral, and cognitive assessments of the stress response, offers the greatest degree of information. One measure, the Strain Questionnaire (SQ) (Lefebvre & Sandford, 1985) assesses all three dimensions using a self-report format.

The transactional model of stress emphasizes the importance of evaluation of stressors and cognitive appraisal processes and their outcome, the stress response (Cox, 1978). This model hypothesizes that environmental

factors (i.e., potential stressors) may influence the pattern of coping efforts that are set into motion during a stressful transaction and also that coping may influence which environmental factors will be involved and what form they will take (Coyne & Lazarus, 1980). Therefore, rather than a fixed entity that impinges on the person, environmental stimuli are only potentially important, becoming more salient by their interaction or transaction with coping efforts. Such a model requires a dynamic assessment of the reciprocal interactions of environmental contexts (i.e., potential stressors), cognitive appraisals and coping behaviors (i.e., as mediating variables), and their concomitant physiological, behavioral, and cognitive outcomes (i.e., the stress response).

Stress in Dentistry

Several authors have stated that dentists are a very stressed group of professionals (Dunlap & Stewart, 1981). The job of a dentist is physically hard; moreover, the majority of dentists, because they are private practitioners, are involved in the long-term strains of building a successful practice. Jackson and Mealiea (1977) reported:

> To run a practice, the dental practitioner is required to (1) work with the precision of a watchmaker or diamond cutter, but in a biological environment complete with oral fluids, facial musculature and the sometimes capricious will of their owner; (2) persuade, cajole, in a word,

> sell, in an attempt to deliver the care and service obviously needed yet less frequently understood or desired; (3) allay the fears and anxieties of patients, understand and support, empathize and care; (4) hire, train, and effectively manage notoriously transient personnel, keep financial records, manage inventory, order supplies, deal with subcontractors (dental laboratories), indeed, handle all of the work load of the not-so-small businessman; and (5) stay abreast of the field, read the journals, attend the meetings and make sense of an array of changes in the profession, both of a clinical and sociopolitical nature. (Jackson & Mealiea, 1977, p. 560)

It is no wonder then that many dentists feel overworked and that they must be all things to all people. Hence, it is relatively easy over a period of time to feel stressed and become emotionally burned out. In this section the relevant literature is reviewed in two areas: stressors inherent in the practice of dentistry and the stress response in dentists.

Stressors in the Practice of Dentistry

The vast majority of articles discussing stress in dentistry have focused on characteristics of the dental profession, or stressors inherent in the practice of dentistry, that purportedly are responsible for the high levels of stress that dentists are said to experience. Many factors inherent in practicing dentistry have been mentioned in the literature as stressors: time and scheduling pressure, feeling overworked and hurried, economic pressure (Cooper, Watts, & Kelly, 1987), difficult working conditions (limited access), physical strain or work (Harris & Crabb,

1978), exposure to infectious diseases such as hepatitis and AIDS, threat of malpractice (Phillips, 1982), third party interference in treatment and financial plans (Katz, 1986), treating anxious or fearful patients or patients having pain (Dunlap & Stewart, 1982), negative public image of dentists, lack of appreciation or cooperation from patients (O'Shea et al., 1984), professional isolation (Forrest, 1978), little social support (Nevin & Sampson, 1986), demands of managing staff, and rapidly changing technology and standards of practice (for a recent review see Katz, 1986).

The personality characteristics of dentists which contribute to stress also have been researched. Several observations have been made about the personality style of the "typical" dentist. These characteristics of personality are authoritarian and inflexible (Heist, 1960); hard-working, ambitious, perfectionistic, and emotionally controlled (Sword, 1977a); type A personality traits of competitive, time urgent, extreme impatience; measuring accomplishments in terms of numbers (Howard et al., 1976); low self-esteem, left brain dominated, and unrealistic beliefs, attitudes, and values (King, 1978).

As interesting and informative as the published reports above may appear, many are suggestive rather than definitive, and statistical studies are few. However, it is possible to identify similarities and common themes in the following seven empirical studies about the sources of dentists' stress.

Dunlap and Stewart (1982) analyzed 3,700 questionnaires from replies to a magazine poll on dentists' stress. They found the most common dental stressors were perfectionism, patients exhibiting pain or fear, pressure to earn more money, situations where decisions are questioned or others can not do things right, feelings of overwork, hurry, and lack of appreciation. The authors also examined the overall report of stress by demographic characteristics. The results indicated the never-married group demonstrated less stress than did the marrieds, while the divorced respondents were the most stressed of all categories. Stress, surprisingly, was relatively low in the first year of practice. Then the stress index continued to rise during the first five years of practice, until it reached a rather high plateau where it remained more or less constant through the fourteenth year of practice. After that, it continued to decline through the balance of the dental career. Solo practitioners reported higher stress than those practicing in a partnership or group practice. Another interesting finding was the least stressed group also was the busiest, with the highest patient volume.

In a study of participants at a California scientific meeting (Cooper, Mallinger, & Kahn, 1978), 150 dentists were asked to rate their perceived job stressors in a 15-item questionnaire. The four items with the highest mean scores were coping with difficult patients, trying to keep to a schedule, too much work, and unsatisfactory auxiliary

assistance. After relating each of the 15 items to physiological measures of stress (blood pressure, pulse rate, and ECG readings), they found that only one item, the demands of building and sustaining a practice, was correlated consistently with each of the health criteria measures.

In another study, 977 American dentists, who voluntarily attended a health screening at a national dental meeting, completed a questionnaire on sources of practice stress (O'Shea et al., 1984). Results suggested that six sources in dentists' stress were problems of patients' compliance, pain, and anxiety, interpersonal relationships, the physical strain of work, economic pressures, third-party constraints, and the strain of perfectionism and seeking ideal results. Among the stressors lowest in the composite ratings were isolation from fellow practitioners, competition, monotony, lack of acceptance by patients of the preferred treatment plan, and lack of appreciation. Another significant finding was three-fourths of those surveyed thought dentistry was more stressful than other occupations, but an equally high proportion believed that they were under less stress than other dentists.

Cooper et al. (1987) studied the relationship between possible causes of stress (demographic, personality, and work factors) and the levels of job satisfaction and mental health among a sample of 484 general dental practitioners in the United Kingdom. In this study, the major sources of

stress were pressures from scheduling, staffing, income needs, and quality control. The authors concluded that stress levels in the profession were high, likely to go higher, and were already showing effects with deteriorating levels of mental health and job satisfaction.

Studies by Cooper, Mallinger, and Kahn (1980) and the follow-up by Mallinger, Brousseau, and Cooper (1978) are significant in that they represent the first systematic attempts to evaluate both personality and situational/ environmental contributions to the stressors experienced by dentists. One serious shortcoming is the lack of randomization in selection. Since all subjects (150 and 110, respectively) were volunteers at a health screening clinic for dentists, concern about the representative nature of the sample should be noted. Despite conceptual difficulties regarding the selection of physiological indices as the sole criterion for stressfulness (vs. perceptual criterion), these studies point the way for further examination of the interaction (or transaction) of environmental and personality stressors as predictors of stressfulness and satisfaction for dentists.

Based on the literature review of dental stressors, only one study addressed the need that the American Dental Association (ADA) Bureau of Economic Research & Statistics (1977) mentioned, when they called for studies to interpret "data within a theoretical model of personality and social system theory" (p. 607). Katz (1987), using the theory of

the transactional model of stress, examined both the relative importance of personality factors and factors inherent in the practice of dentistry upon perceived stress and career satisfaction. The personality factor of hardiness was far more predictive of both stress and career satisfaction than were any of the practice stressors. Hardiness was found to be significantly related to lower levels of stress and psychiatric symptoms and higher levels of career satisfaction experienced by the 291 dentists in the study.

By contrast, the practice stressors and outcome measures were significantly related in only a few instances. Only income level and frequency of exercise were strongly related to dentists' career satisfaction. Only specialization was strongly related to reduced stress. Only the number of weeks away from the office was found to be significantly related to both reduced stress and increased career satisfaction (Katz, 1987). The findings of this study support the position that the sources of stress for dental practitioners are a function of their personality and perceptions rather than their practice stressors.

Stress Response in Dentists

Another body of literature relates to the stress response in dentists: the purported high incidence of physical, emotional, and behavioral problems which result among stressed dentists (Forrest, 1978; Katz, 1978; Sword,

1977a, 1977b). Problems frequently cited, in these and other articles, as the consequences of stress for dentists include cardiovascular disease, depression, divorce, alcoholism, drug abuse, and suicide.

A frequently cited study, published 26 years ago by Russek (1962), indicated that the prevalence of coronary heart disease (CHD) among dentists is more highly influenced by the relative level of occupational stress than by heredity or diet. A more recent report (Nielsen & Polakoff, 1975) found that coronary heart disease and hypertension are 25% more prevalent in dentists than in the general population. Indeed, Steinberg (1977) stated cardiovascular disease is the most frequent cause of premature death, killing nearly 7 out of 10, in middle-aged male dentists.

Investigators of maladaptive behavior outside the dental office but resulting from stress within the office environment--divorce, alcoholism, or drug abuse--suggest that stress at work could result in expressions of symptoms in the personal life. Indeed a high rate of divorce among dentists is frequently reported (Sword, 1977a). However, the American Dental Association (ADA) Bureau of Economic Research and Statistics (1977) reported that a literature search found only one article on this topic. This study of divorce complaints filed in California (Rosow & Rose, 1972) found that the divorce rate of dentists was lower than that of the general population. In fact, all professionals had a lower divorce rate, with dentists having one of the lowest.

Substance abuse has frequently been linked to overwork and stress. Clarno (1986) stated that, based on the evidence available today, it is not known whether dentists suffer from a higher or a lower incidence of alcoholism than does a similar population sample within society. The National Council on Alcoholism estimates that the percentage of alcoholics among professionals in general is 1 1/2 times greater than that among nonprofessionals (Forrest, 1978). Bissell and Haberman (1984), in an important and recent review of alcoholism in the professions (dentists, physicians, nurses, attorneys, social workers, and college women), estimated that 8% of the dentists in the country were alcoholic. There also is evidence that owing to the accessibility of controlled substances in the practice of dentistry, dentists may have a slightly higher incidence of drug dependence than the average population. But this also is true in medicine and nursing. However, one study found that dentists reported less stress and less drug use than physicians (Stout-Wiegand & Trent, 1981).

Stress can be a significant problem in dentistry and it can, undeniably, be a factor in the onset of depression (Shurtz, Mayhew, & Cayton, 1986). In a conceptual article, Sword (1977a) discussed the relationship of depression to substance abuse and suicide. The description of the pre-depressive personality--hard-working, ambitious, perfectionistic, and emotionally controlled--was presented as typical of the average dentist. Sword argued that while

such characteristics are adaptive in aiding the dentist in achieving life goals, the same characteristics may predispose the dentist to experiencing a high level of stress and dissatisfaction when faced with the limiting realities of dental practice. Depression can result over a period of time from becoming emotionally burned out (Wiley, 1986). This in turn can lead to seeking an escape in alcohol, drugs, or suicide.

Perhaps the most frequently discussed and thoroughly researched topic concerning stress-related problems among dentists is that of suicide. Numerous articles have appeared in the dental literature about the problem and how to combat it (Forrest, 1978). One study (Blachly, Osterud, & Josslin, 1963) found that dentists had the highest suicide rate among any profession. Despite methodological flaws in this regional study, this view of dentists as having the highest suicide rate has been perpetuated in the media and become a popularly held belief among dentists and much of the general public. Rose and Rosow (1973) found that dentists had a suicide rate, comparable to physicians, approximately twice that of the white, male population of the United States. Orner (1978) concluded that dentists have a lower rate of suicide than does the population as a whole, and that causes of death as the result of any illness were no greater among dentists than could be expected by chance alone.

The topic of suicide among dentists is admittedly controversial (Ayer & Moretti, 1985). The American Dental Association (ADA) has expressed concern over the problem and has sponsored research and national conferences to discuss the topic (ADA News, 1977, February 21). The ADA Bureau of Economic Research and Statistics (1977) reported on an extensive study conducted by Temple University School of Dentistry researchers (Temple University, School of Dentistry, 1976). The results of this study, which is considered the most extensive to date in both scope and methodology, concluded that dentists do not differ from the general population in suicide rate and have a death rate from all causes that is less than the general population in all age groups.

While the issue of dental suicide may have been minimized by this report, the issue of stress among dentists appears to be very much alive based on the frequency of articles on the topic in the dental literature. Many of the conclusions about dental stress drawn from these opinion articles are invalid according to the research. But the mythology of dental stress has become so credible and oversold that even many dentists cannot distinguish between fact and fantasy (Hark, 1983).

Satisfaction

As with stress, there is no single meaning for the term satisfaction. Furthermore, satisfaction is often used

interchangeably with similar terms such as happiness, quality of life, and adjustment. According to Campbell, Converse, and Rodgers (9176), satisfaction implies a cognitive judgment of a current situation laid against external standards of comparison such as "other people I know" or more private levels of aspiration. This may be compared to happiness, which seems to evoke chiefly an absolutely emotional state (Campbell et al., 1976). Quality of life is different still in that it is usually measured by some objective standard, such as ownership of luxury items, and thus assumes that people who have a high quality of life are satisfied. Finally, the term adjustment is often used similarly to satisfaction, especially in the area of marriage, even though adjustment refers more to congruence between partners in expectations, performances, and values (Rhyne, 1981). This study and the following review of literature focuses on satisfaction.

Theories of Satisfaction

There are several theoretical explanations of satisfaction. These include Maslow's (1954) need hierarchy, the motivation theory as proposed by Herzberg (1966), theories that compare expectations and performance, and finally theories based on rewards.

Maslow (1954) asserted that people have five different classes of needs, and that these are arranged on a hierarchy of prepotency. The less potent do not come to govern

behavior until the more potent are fulfilled. The five classes of needs are physiological needs, safety needs, needs relating to belonging, friendship and love, esteem needs, and the need for self-actualization. The assumption is that the higher one gets in the hierarchy, the more one is satisfied. Unfortunately, acceptance of the theory is largely an act of faith, for little research has been carried out to verify it (Cox, 1978).

Herzberg (1966) has developed a theory suggesting that the nature of the work performed is itself an important factor in determining the level of satisfaction experienced. Individuals who find their daily tasks interesting or challenging are likely to experience more satisfaction than those who find their work tasks tedious or boring. Herzberg (1966) proposed the two-factor, motivation-hygiene theory to describe work satisfaction. Herzberg argued that satisfaction depends on motivator factors, whereas dissatisfaction relates to hygiene factors. Good hygiene, such as better working conditions and more pay, are theorized to decrease dissatisfaction, but do not promote satisfaction. Motivation factors such as achievement, recognition, responsibility, and opportunity for personal growth or advancement will increase satisfaction. Unfortunately, many studies have failed to support this theory (Cox, 1978).

Locke, Cartledge, and Knerr (1970) proposed that satisfaction is a function of the degree to which one's

performance achieves one's desired goal or is discrepant from one's value standard, with the former resulting in higher satisfaction and the latter in lower satisfaction. Similarly, Locke (1975) argued that satisfaction is related to the amount of discrepancy existing between how much is wanted and how much is obtained. Hence, it appears important to examine the extent to which expectations have been realized to determine a person's true level of satisfaction.

The expectancy theory, developed by Wabah and House (1974), considers job satisfaction to be measured by work motivation. The theory states that if after a reasonable expenditure of effort, one's professional expectations are not met, the result will be a lower level of professional motivation and satisfaction. Linsenmeier and Brickman (1980) propose a similar idea. They suggest that satisfaction is based, at least in part, on the goals or expectations of the individual. They add that, although performing well is generally more satisfying than performing badly, the lower the expectations, the more the person will be satisfied. They suggest, in short, that people will be satisfied with themselves and what they accomplish to the extent that their accomplishment exceeds what they had expected to achieve, and disappointed if it fails short of what they had expected. Thus, people who underestimate themselves are apt to be continually surprised by success,

whereas those who overestimate themselves are apt to be surprised by failure.

In effect, satisfaction depends on expectations regarding performance outcomes as well as the performance outcome itself. Vroom (1964) defined satisfaction as the affective orientation on the part of individuals toward the roles they are presently occupying. Satisfaction also is a function of the attainment of rewards. Thus, the more rewards a role offers, the more satisfied a person will be with it. The theory and research in the area of satisfaction has generally focused on satisfaction within a role. Such areas as job satisfaction and marital satisfaction are common in the literature. Thus, each role has its own specific theories and assessment techniques. However, there is a tremendous amount of overlap among roles in how satisfaction is conceptualized.

Campbell et al. (1976) proposed that job satisfaction is based on how persons perceive their job situation. This is based, in part, on objective characteristics of the job and on characteristics of the respondent which determine how the person perceives the characteristics of the job. Thus, one approach to assessing job satisfaction is to solicit individuals' assessments of the attributes of their jobs. Attributes that have been found to be important are comfort, challenge, pay, coworker relations, and resources (Campbell et al., 1976). A different approach to assessing job satisfaction is to focus on the individuals' assessments of

the fit between career and abilities and interests, and the degree to which they feel successful. This approach has been taken by Osherson and Dill (1983).

How satisfaction in one role affects satisfaction in other roles has been the topic of some interest and investigation. The most commonly researched interrelationship is between the roles of life in general and work. Studies have generally found a positive relationship between work satisfaction and satisfaction with life in general (Campbell et al., 1976; Greenhaus, 1974; Hulin, 1969; Iris & Barrett, 1972; Kornhauser, 1965; London, Crandall, & Seals, 1977; Schmitt & Mellon, 1980). Campbell et al. (1976) estimate that 20% of the variance of life satisfaction is shared with work satisfaction and conclude that work satisfaction is one of the most important predictors of life satisfaction. That is, at least for the roles of work and general life, people who are satisfied with one role are likely to be satisfied with their other roles. However, the relationship is not perfect. There is 80% of the variance that is still unaccounted for, using the estimate of shared variance computed by Campbell et al. (1976). Thus, it may be wise to study career satisfaction and general life satisfaction separately.

Career Satisfaction of Dentists

Although most dentists respond quite positively when asked if they are satisfied with their work or choice of

profession, not much is known about factors contributing to satisfaction with dentistry. Such information is becoming increasingly important in light of the changing nature of dental practice and the desire to reduce unnecessary stress (Dunlap, 1977).

The practice of dentistry seems to possess many of the characteristics commonly associated with satisfaction. It offers prestige, good income, potential for personal development, and it is a helping profession. Indeed, Bisconti and Solmon (1977) showed that many of the characteristics of traditional private practice, such as the freedom to design one's own work and to fully use one's skills, were associated with satisfaction. In addition, dental practice rarely requires working in large organizations or doing repetitive clerical tasks, both of which have been associated with occupational dissatisfaction.

Jackson and Mealiea (1977) claim other factors, such as the ability to control one's personal environment and to use planning to avoid unnecessary financial burdens, are related to satisfaction and can result in a reduction of stress. They also suggest that dentists who find it rewarding to interact professionally with peers experience a higher level of satisfaction. The practice of dentistry does in fact contain many of the factors traditionally associated with positive career satisfaction. It offers prestige, relative autonomy, income well above the average, the opportunity to

help others as well as creative and artistic challenges. Although career satisfaction among dentists varies widely, the plethora of reports describing their career dissatisfaction (often linked to high stress) is not supported by empirical research investigating the topic (King, 1978; Sword, 1977b). Hence dentists' career satisfaction, typically, has been found on the average to be quite high (George & Milone, 1982).

Eccles and Powell (1967) conducted a mail survey of 231 dentists practicing in South Wales. Some relevant findings were that dentists between the ages of 23-24 and those over 65 were the most satisfied, while those in the 45-54 age group were the least satisfied. The greatest sources of satisfaction were related to achievement and satisfaction in the work itself, as well as good relationships with patients. The greatest sources of dissatisfaction and difficulty lay in the external limitations imposed on the dentist and the pace of the work. Income and status had little effect on job satisfaction. Sixty percent of the dentists said they liked their work while 19% stated that they did not like it.

Howard et al. (1976), in a previously cited study, attributed stress as a factor in the job dissatisfaction of dentists. The best predictors of job satisfaction were the job's interference with one's personal life, the length of time in one's present location, and the number of years of

experience of the dentist. The younger dentists were found to be the most dissatisfied in the group.

A trio of studies on Utah dentists yielded some interesting results. Murray and Seggar (1975) found an unusually high level of role satisfaction (90%) among 253 dentists practicing in Utah. Levels of satisfaction were negligibly affected by age, number of years in practice, social participation, or practice location. In 1980, Murray compared the results of the role satisfaction of dentists from two different cultural areas. The Utah study was essentially replicated and compared with a study of 94 dentists practicing in Kentucky. While the relationship between role satisfaction and age and role satisfaction and years practicing was not statistically significant, there was an increase in satisfaction with an increase in the number of years practicing for the Kentucky group. Conversely, the younger dentists in the Utah sample tended to be more satisfied than their Kentucky counterparts.

Schwartz and Murray (1981) in a secondary analysis of the Utah study investigated various aspects of the original data to try to understand the reasons for the unusually high career satisfaction level of their respondents. One of the findings was that dentists who reported their fees were "too low" tended to be significantly less satisfied than those dentists who reported their fees were "about right." They concluded that a higher fee structure for dental services may be associated with increased work satisfaction, and that

a low fee structure is associated with lower dentist work satisfaction.

Lange, Loupe, and Meskin (1982) reported the results of a longitudinal study of University of Minnesota School of Dentistry graduates entering their sixth year of practice. The researchers sought to determine whether there were any characteristics of the dentists or the practice that accounted for differences in satisfaction between two groups, of 14 dentists each, identified as "satisfied" and "dissatisfied." While age was not a factor in this group of young dentists, the overall results identified professional and community involvement as an important characteristic of the more satisfied group. The most satisfied dentists also seemed to be less threatened by change and hold a more positive view of the profession. Conversely the less satisfied dentists were not as optimistic as the most satisfied dentists.

Yablon and Rosner (1982) also studied the relationship of age and income to three categories of career satisfaction. They surveyed 1172 graduates of Columbia University's School of Dentistry and Oral Surgery. The three categories of career satisfaction were intrinsic, extrinsic, and overall career satisfaction. The results indicated a general trend toward increased overall satisfaction with increasing age. Age was significantly related to extrinsic satisfaction, but was not significantly related to intrinsic or overall satisfaction. In general,

dentists' satisfaction increased with increasing income, but only up to a point. Apparently the lack of income was more a source of dissatisfaction than the existence of high income was a source of positive satisfaction.

In another article about the same study, Yablon and Mayhew (1984) reported on nonchairside factors that contributed to the career satisfaction of dentists. The results indicated that dentists whose background and personal characteristics promoted life stability and who were in the mainstream of the professional community tended to be more satisfied. These characteristics were exemplified by a more religious orientation, being married rather than single, continuing education involvement, and a higher social class background (as measured by educational attainment of parents).

In a survey of 224 practicing North Carolina dentists, George and Milone (1982) found dentists' satisfaction depended largely on income. Dentists in the most financially successful practices tended to be younger, employ more auxiliaries, see more patients per day, have more patients on their recall lists, take more continuing education, and be more satisfied with their careers. These findings were supported by a more recent study on dental stress and satisfaction. Katz (1987) concluded that the satisfied dentist appeared to have a financially successful practice, exercised regularly, and took more time off for vacation and continuing education courses than less satisfied dentists.

Mediator Variables in the Stress Process

A large body of literature (life events research) has demonstrated that stress plays a precipitating role in the onset of physical and psychological disturbance. The literature also has documented that the relationship between stressful life events and future (physical or psychological) illness, although statistically significant, is relatively small in magnitude (Dohrenwend & Dohrenwend, 1974). Given the very large sample sizes characteristic of life events research, even very small correlations of no practical utility may pass tests of statistical significance (Rabkin & Streuning, 1976). When reports of obtained correlation coefficients are included in the reports, they are typically below .30 (accounting at best for 9% of the variance and typically 3-4%). The standard deviations of these associations also are quite extreme suggesting considerable variability across individuals in the degree to which stress is associated with illness (Feuerstein, Labbe, & Kuczmierczyk, 1986). Thus researchers have been searching for factors that may act as mediators, moderators, buffers, or resistance resources against the adverse effects of life stress (Antonovsky, 1979). Hence as the mediators of life stress are identified, measured reliably, and included in research designs, increased predictiveness is likely to result (Johnson & Sarason, 1979).

Stress resistance has been associated with a wide variety of resources including intelligence (Antonovsky &

Bernstein, 1977); having a high rather than a low income (Luborsky, Todd, & Katchen, 1973); physiological or constitutional strengths such as a well-functioning immunological system (Marshall, 1977), family medical histories that are free of certain genetically linked diseases (Kobasa, Maddi, & Courington, 1981; Weiner, 1977), health practices (Wiebe & McCallum, 1986), and exercise (Cooper, Gallman, & McDonald, 1986; Kobasa, Maddi, & Puccetti, 1982); social resources such as being married rather than single (Myers, Lindenthal, & Pepper, 1974), perceived social support (Billings & Moos, 1981; Cobb, 1976; Schaefer, Coyne, & Lazarus, 1981; Thoits, 1986); coping styles (Lazarus & Folkman, 1984; Pearlin & Schooler, 1978); and certain personality characteristics such as the absence of Type A behavior patterns (Chesney, Black, Chadwick, & Rosenman, 1981; Friedman & Rosenman, 1974), internal locus of control (Johnson & Sarason, 1978), dispositional optimism (Scheier, Weintraub, & Carver, 1986), and hardiness (Kobasa, 1979). The mediator variables included in this study, and reviewed in this section, are hardiness, coping style, social support, and health practices.

Hardiness

In a novel approach to the problem of low correlations between stress and illness, Kobasa (1979) hypothesized the reason may be due to the fact that a number of subjects under high stress were not getting sick. Perhaps what was

needed was a scrutiny of the factors which differentiated between highly stressed people who did and did not get sick. Kobasa (1979) studied middle- and upper-level business executives, in a large public utility in a major metropolitan area, to see which ones did and did not develop illness as a consequence of their stressful lifestyle. First, Kobasa divided the group into executives who had experienced a lot of stress during the previous three years and those who had experienced less stress, using the Schedule of Recent Life Events (SRE) and the Social Readjustment Rating Scale (SRRS) (Holmes & Rahe, 1967). Then, looking only at the high-stress executives, using selected items from the Seriousness of Illness Survey (Wyler, Masuda, & Holmes, 1968), Kobasa compared those who had had a lot of illnesses with those who had had relatively few illnesses to see what distinguished them. In the final sample of 200 males, Kobasa found that the highly stressed but healthy (high stress/low illness) executives were distinguished by a multifaceted personality style Kobasa termed hardiness.

The hardy personality is composed of three characteristics. The first is a sense of commitment, or a generalized sense of purpose or meaningfulness that is expressed as a tendency to involve oneself deeply in whatever one encounters. The second factor is a belief in control, the sense that one influences the events that happen in one's life and that one can at least partially

control one's environment. The third component is challenge, a perception of change, not as a threat but, as a normal part of life that provides opportunities for growth and development. As a result of their sense of commitment, control, and challenge, hardy individuals may appraise potentially stressful life events more optimistically than would individuals who are not so hardy. Therefore, they may take more direct action to find out about these events, to incorporate them into their lives, and to learn from them what may be of value for the future. Consequently, an important way in which the hardy individual avoids the illness that potentially stressful events can cause is by transforming these events into less stressful ones.

Although the hardiness concept has been criticized on measurement grounds (e.g., Ganellen & Blaney, 1984), Kobasa's work is significant for several reasons. First, it identifies a personality factor, hardiness, that appears to buffer against stress (see also Kobasa, Maddi, & Courington, 1981; Kobasa, Maddi, & Puccetti, 1982). Second, it clearly illustrates that this factor can moderate the relationship between stress and illness. Third, it is an illustration of an important method of studying stress, namely, focusing attention on the people who do not succumb to stress rather than the ones who do become debilitated by stress. This emphasis is consistent with Antonovsky (1979) who urged researchers to examine the causes of good health and not merely those factors that lead people to be stressed or ill.

In the initial study, hardiness was measured by 15 various scales covering all three components of hardiness. They included the Internal-External Locus of Control Scale (Rotter, Seeman, & Liverant, 1962), nine scales from the Alienation Test, including the Adventurousness versus Responsibility scale, the Powerlessness versus Personal Control scale, the Nihilism versus Meaningfulness scale, the Alienation from Self, Work, Interpersonal Relationships, Family and Friends scales, and the Vegetative versus Vigorousness scale (Maddi, Kobasa, & Hoover, 1979), the Achievement scale, the Need for Cognitive Structure scale, and Need for Endurance scale of the Personality Research Form (Jackson, 1974), as well as the Preference for Interesting Experiences scale and the Security Orientation scale of the California Life Goals Evaluation Schedule (Hahn, 1966).

A discriminant function analysis, identifying the best combination of variables for explaining differences between the groups, explained 74% of the total variance between the groups leaving only 26% unexplained (Kobasa, Hilker, & Maddi, 1979). Results indicated that high stress/low illness subjects scored significantly lower on nihilism, external locus of control, powerlessness, alienation from self, and vegetativeness than did high stress/high illness subjects. These findings were enhanced by the fact that various demographic characteristics such as age, education,

and socioeconomic level failed to discriminate between the two groups.

There have been two longitudinal studies with subjects drawn from the original population. Kobasa, Maddi, and Kahn (1982), using a prospective research design with 259 subjects, tested the effects of hardiness on the stress-illness link over a two-year follow-up period. Stress and illness were measured the same way as in the earlier investigation (Kobasa, 1979). Six instruments were used to assess hardiness. They included two tests of commitment, the Alienation from Self and Alienation from Work scales from the Alienation Test (Maddi et al., 1979), two tests of control, the External Locus of Control Scale (Rotter et al., 1962) and the Powerlessness scale of the Alienation Test (Maddi et al., 1979), and two tests of challenge, the Security Scale of the California Life Goals Evaluation Schedule (Hahn, 1966) and the Cognitive Structure Scale of the Personality Research form (Jackson, 1974). Subjects filled out the stress and illness questionnaires once a year for three years. The hardiness questionnaires were completed only in the first year.

As part of the data analysis, Kobasa, Maddi, and Kahn (1982) first examined intercorrelations among the six scales used to measure hardiness. Because cognitive structure did not share common variance with the other scales, it was eliminated from the overall test. This resulted in the final use of five scales to assess hardiness. Further

analyses of the data using an analysis of covariance with prior illness (measured in the first year) as the covariate, illness (measured in the second and third years) as the dependent variable, and hardiness (measured in the first year), and stress (measured in the second and third years) as independent variables indicated that stressful life events were associated with increased illness and that hardiness decreased the likelihood of symptom onset. Furthermore, hardiness interacted with stressful life events, indicating that it is especially important to be hardy if one is experiencing intensely stressful life events.

More recently, other studies have investigated the joint influence of hardiness and other mediating variables such as constitutional strength, exercise, social resources, and Type A behavior pattern. Kobasa, Maddi, and Courington (1981), using the same business executive sample and the refined five subtest measure of hardiness, operationalized constitutional predisposition as parents' illness. With prior illness statistically controlled for, stressful life events, hardiness, and constitutional predisposition all had main effects on later illness. Hardiness and constitutional predisposition were not significantly correlated with one another, indicating that they were not just measuring the same construct. The authors concluded that hardiness, constitutional predisposition, and stressful life events

have an additive effect with regard to illness, with stressful life events increasing illness and a healthy constitutional predisposition and high hardiness decreasing illness.

Kobasa, Maddi, and Puccetti (1982) investigated the effects of hardiness and exercise as buffers in the stress-illness relationship. Using the same sample and measures, hardiness and exercise were not found to be related to one another, but both were related to illness. Furthermore, both interacted with stressful life events, indicating that they may be most helpful under high stress conditions.

Kobasa and Puccetti (1983) investigated social resources as well as hardiness. Using the same business executive population, they measured social resources on the home and work subscales of the Environment Scale developed by Moos and his colleagues (Moos, 1976; Moos, Insel, & Humphrey, 1974) and by the Social Assets Scale developed by Luborsky, Todd, and Katcher (1973). Along with the main effects of hardiness and stressful life events on illness, boss-support interacted with stressful life events in such a way that boss-support reduced illness more in high stress executives. Stressful life events, hardiness, and family support interacted such that those who were high in stressful life events, high in perceived family support, and low in hardiness were at highest risk for illness. Social assets were not found to be related to illness.

Kobasa, Maddi, and Zola (1983), also using the same male business executive population, examined the relationship between Type A behavior pattern and personality hardiness and stress and illness in 158 subjects. Type A and hardiness were found to be conceptually different personality orientations and empirically independent factors. Type A and hardiness emerged from this study as bases for extrinsic and intrinsic motivation, respectively. The results confirmed the prediction of an interaction between the two variables that influenced illness onset. Under high stressful life events, male executives who were high in Type A, but simultaneously low in hardiness, showed the greatest deterioration of general health in the face of mounting stressful life events.

Kobasa (1980), establishing the relevance of hardiness to stress-resistance in other occupational groups, compared the executives previously studied to lawyers and career army officers. In addition to illness as an outcome, she also measured the presence or absence of psychiatric symptoms. With the army officers, a high correlation was found between stressful life events and both physical illness and psychiatric symptoms. The personality variables of challenge, commitment, and control were all significant such that the officer with a low commitment, high interest in challenge, and low sense of control tended to have the highest level of physical and emotional symptoms (see Katz, 1981, for review). Lawyers surprisingly were found not to

show a significant correlation between stress scores and diagnosable physical illness (Kobasa, 1982). There was, however, a significant relationship between lawyers' stress experience and their complaints of strain (in this case physical and mental symptoms associated with the stress response). This relationship was mediated by two stress-resistance resources: commitment and regressive coping techniques. However, two other stress resistance resources, social support, and exercise were not found to significantly affect the degree of strain reported.

Kobasa explained the differences between outcomes for various professions on the basis of the "professional ideology" of the respective groups (see Katz, 1981). According to Kobasa (1982), within the legal profession, there is a belief that stress is what makes the profession stimulating and challenging. Whereas, the business executive and the army officer exist in very different ideological contexts. Within business, and especially executive ranks, there is a strong belief that stress is destructive. The army officer (Kobasa, 1980) presents a somewhat different situation. The rigid authoritarian system in which the officer functions requires giving up a high degree of control to others. Many officers also find themselves functioning in roles in the modern army far different from the challenging and exciting role of combat for which they may have joined the army and were prepared through training. The result seems to be a loss of

commitment to the goals and purposes of the systems in which they operate. The result of such conflicts between "subjective role perception and objective role definition" (Katz, 1981) leads to the more destructive stress related outcomes which the officers experience.

It is interesting to note that the published research on hardiness by Kobasa and associates, at the Chicago Stress Project, has been with males only and primarily with business executives. More recently other researchers have extended the investigation of hardiness to other populations. Ganellan and Blaney (1984) as well as Wiebe and McCallum (1986) studied the joint mediating effects of hardiness with social support and health practices, respectively, in college students. Katz (1987) examined the effect of hardiness on stress and satisfaction in dentists. While Hammond (1987) investigated the relative mediating effects of hardiness, social support, and coping style on stress and satisfaction in academic multiple role persons. These last two reports are reviewed in other sections of this chapter.

Ganellan and Blaney (1984) investigated the effects of hardiness and social support on illness. The presence of stressful life events was measured by the Life Experiences Survey (Sarason, Johnson, & Siegal, 1978). Illness was measured by the Beck Depression Inventory (Beck, 1967). Hardiness was measured slightly differently from the studies previously conducted. Ganellen and Blaney (1984) used the

Internal subscale of the Levenson Locus of Control Scale (Levenson, 1974), and the Powerlessness, Vegetativeness, Nihilism, Adventurousness, and Alienation from Self subscales of the Alienation Test (Maddi et al., 1979). Social support was measured by the Social Perception Questionnaire developed by the authors (Ganellen & Blaney, 1984).

Using a sample of 83 female undergraduates, the results first indicated that the tests measuring commitment and challenge were both strongly associated with social support. In analyzing the relationships among hardiness, social support, stressful life events, and depression, depression was found to be related to stressful life events, social support, and the alienation from self and vegetativeness subscales of hardiness. Only the Alienation from Self subscale interacted with stressful life events to significantly affect depression.

Ganellen and Blaney (1984) concluded by reiterating the effect of social support on depression and by questioning how interrelated are the three dimensions of hardiness. It must be noted, however, that Ganellen and Blaney used different instruments to measure life events, illness, and hardiness than did Kobasa and colleagues. Thus, it may not be appropriate to generalize the results obtained by Ganellen and Blaney to the previous research conducted by Kobasa and colleagues.

Two stress and illness models that included the mediating effects of health practices and hardiness were tested prospectively over a two-month period by Wiebe and McCallum (1986). Sixty female and 26 male undergraduate students completed the hardiness test as described by Kobasa (1982). Stress, health practices, and illness for the prior month were assessed as well as one and two months later. Health practices were measured by the Self Care Inventory (Pardine, Napoli, & Dytell, 1983). Illness was measured in the first model by the severity of physical symptoms reported on the Seriousness of Illness Rating Scale (Wyler, Masuda, & Holmes, 1968); whereas in the second model, it was measured by the number of physical symptoms reported.

Path analyses for both models revealed that the direct impact of stress on illness diminished when other variables were included. Hardiness exerted its effects on illness directly as well as indirectly by its impact on health practices. The results indicated that hardiness did not appear to have a stress buffering effect on illness; rather it appeared to mediate the impact of stress on health practices. Therefore, it could be misleading to view hardiness as a stress-resistance resource. The authors concluded that hardy individuals appeared to maintain better health practices while experiencing stress than do nonhardy individuals. Hence, hardy individuals may be more healthy because they practice better health behaviors than nonhardy individuals.

Several differences between this study and prior studies on hardiness may contribute to the contrasting results. First, the population in this study included a large number of females, was younger, and was exposed to different types of stressors than the middle-aged, male executives in previous studies. Secondly, this prospective study used a shorter time period (three months) than prior studies which used several years.

Coping

The impact of any potentially stressful event is substantially influenced by how a person copes with it. Recall that according to the transactional model of stress (Lazarus & Folkman, 1984), cognitive appraisal, or evaluation, of potentially stressful events mediates psychologically between the individual and the environment when the individual encounters a stressful event. Any new event or change in the environment prompts the individual to make a primary appraisal about the significance of the event. An event can be appraised as benign (positive), irrelevant (neutral), or stressful (negative). If an event is judged to be stressful, it will further be judged in terms of the harm or loss that has already been done, the future threat associated with the event, and the potential challenge of the event--that is, the perception that gain, growth, or mastery may result from dealing with the event.

Once these primary appraisals are made, the individual makes a secondary appraisal. Secondary appraisal is the continuous evaluation of one's coping resources and options to determine whether they will be sufficient to overcome the harm and threat that the event represents. The extent to which an individual experiences psychological stress, then, is determined by the evaluation of both what is at stake (primary appraisal) and what coping resources are available (secondary appraisal).

It is important to define operationally what is meant by coping. Coping, according to Lazarus and colleagues (Lazarus & Folkman, 1984), is defined as the cognitive and behavioral efforts to manage environmental and internal demands and the conflicts among them. These cognitive or behavioral actions, or efforts, are directed at mastering, tolerating, reducing, and/or minimizing environmental and internal demands and conflicts that are appraised as taxing or exceeding the resources of the person. Although coping is commonly conceptualized as occurring in reaction to stressful situations, it also can occur before a stressful confrontation. This form of coping is anticipatory coping. Coping also refers to the efforts to manage demands, regardless of the success of those efforts. The effectiveness of any given coping strategy is not inherent in the strategy (Folkman, 1984).

Coping can be thought of as having two components: the methods of coping used and the focus of the coping response.

In terms of the method of coping, the individual can utilize either an active response to resolve the stressful event or choose to avoid the stressor (avoidance coping). The focus of the coping response may be directed at the problem itself (problem-focused) or the emotional consequences of the stressor (emotion-focused) (Folkman, Schaefer, & Lazarus, 1979; Pearlin & Schooler, 1978). Problem-focused coping efforts are attempts to do something constructive about the stressful conditions that are harming, threatening, or challenging an individual. Emotion-focused coping involves efforts to regulate the emotional consequences of the stressful event. Sometimes problem-solving efforts and emotional regulation work together. However, problem-solving efforts and emotional regulation also may work at cross purposes.

There are literally hundreds of coping strategies an individual might use in confronting a stressful event. Some will be problem-focused and others will be oriented toward emotional regulation. The same person may engage in intrapsychic coping efforts, information seeking, direct actions, turning to others, and inhibition of action (Cohen & Lazarus, 1979) at different points in coping with the same event. Which coping responses will be used depends in large part on the nature of the stressor itself and the individual's coping style.

Coping style is a general propensity to deal with stressful events in a particular way. For instance, there

are people who become nearly hysterical at the smallest stressor, whereas other people seem to be able to confront huge amounts of stress and remain nearly unflappable (Taylor, 1986). This is an example of difference in coping style. Although a variety of coping styles exists, only a few have received systematic study.

Pearlin and Schooler (1978) studied normative coping responses to normative life problems in a large sample of 2300 adults (ages 18-65) in Chicago. Through a structured interview format information was gathered about life strains and the coping repertoires people used for these strains in each of four role areas--occupation, household economics, marriage, and parenting. The researchers also examined the emotional stresses, depression, and anxiety in response to the strains. Coping responses represented some of the things that people do, their concrete efforts to deal with life strains encountered in their different roles. Coping resources referred not to what people do, but to what was available to them in developing their coping repertoires. Social resources represented the interpersonal networks which were a potential source of support: family, friends, co-workers, neighbors, etc. Psychological resources represented some of the things people are, the personality characteristics that people draw upon to help them withstand stress.

The coping responses were divided into three categories by the nature of their functions: (a) responses that modify

the situation (the most direct method); (b) responses that function to perceptually control the meaning of the problem (e.g., positive comparisons, selective ignoring, and substitution of rewards); and (c) responses that attempt to minimize the discomforts engendered by the problems, but are not directed at the problems themselves.

The efficacy of 17 concrete coping behaviors representing these three functions was evaluated. Results indicated that individuals' coping interventions were most effective when dealing with problems within the close interpersonal area of marriage, and to a lesser extent parenting, and least effective when dealing with the more impersonal problems found in occupation. The most effective coping responses were unequally distributed in society, with men, the educated, and the affluent making greater use of the efficacious mechanisms. Pearlin and Schooler (1978) also found that using a particular coping response was less important, for the effects of stress, than using a variety of coping responses.

Using the same data from the random sample of 2300 adults (Pearlin & Schooler, 1978), Fleishman (1984) examined the relationships between coping and general personality variables of mastery, self-esteem self-denial, and nondisclosure of problems. Findings indicated that both general personality variables and the presence of stressful life conditions affected the frequency of coping. Several patterns emerged. The personality variable of self-denial

affected use of emotion-focused coping, and nondisclosure reduced advice-seeking, whereas mastery and self-esteem had weaker effects. The author concluded that coping depended upon whether problems occurred either in an interpersonal or impersonal context and on whether one preferred to act independently or seek aid from others.

Billings and Moos (1981) explored the nature of individual and social resources as intervening processes mediating the effect of life events on psychological and physical distress. As in Pearlin and Schooler (1978), their analyses focused on two approaches to classifying coping responses, method of coping and focus of coping, and on their roles in moderating the effects of stress. The method of coping classification divided coping attempts into three categories. Active-cognitive coping included attempts to manage one's appraisal of the stressfulness of the event. Active-behavioral coping referred to overt behavioral attempts to deal directly with the problem and its effects.

Avoidance coping referred to attempts to avoid actively confronting the problem or to indirectly reduce the emotional tension by such behavior as eating or smoking more. The second classification, focus of coping, was composed of two categories: problem-focused and emotion-focused coping (Antonovsky, 1979; Lazarus, 1980). Problem-focused coping included attempts to modify or eliminate the sources of stress through one's own behavior. Emotion-focused coping included behavioral or cognitive responses

whose primary function was to manage the emotional consequences of stressors and to help maintain one's emotional equilibrium. Billings and Moos (1981) created a 19-item questionnaire to assess the use of the three methods of coping categories and the two foci of coping categories.

Results were presented for a representative community sample of 194 two-parent families in the San Francisco Bay Area. Small but significant gender and contextual differences in coping were identified. Women were more likely to use avoidance coping, which was associated with greater impairment of functioning. Persons with more education and income also were more likely to use more effective coping. This was consistent with the findings of Pearlin and Schooler (1978). The predictive value of social support also was less salient among men than among women. The conclusion was that measures of coping and social resources did mediate the relationship between stressful life events and personal functioning (Billings & Moos, 1981).

More recently, Billings and Moos (1984) explored the roles of stress, social resources, and coping among 424 men and women entering treatment for depression. Stressors, social resources, and coping were additively predictive of patients' functioning. However, coping and social resources did not have stress-attenuation or buffering effects for this group of clinically depressed patients (as it has for normal subjects). Holahan and Moos (1985) extended this

work on factors that buffer potentially negative health effects of life stress. A survey was used to measure personality characteristics, coping strategies, and family support with a representative community sample of 267 two-parent families. Respondents were divided into two comparison groups (as in the Kobasa (1979) hardiness study), high stress/high distress and high stress/low distress. Findings demonstrated that those who adapted to life stress with little physical or psychological strain were more easy-going and less inclined to use avoidance coping than individuals who became ill under stress. In addition, in the stress resistant group, men were more self-confident and women had better family support than their counterparts in the distressed group.

Folkman and Lazarus (1980) analyzed the ways 100 community residing men and women, aged 45-64, coped with the stressful events of daily living during one year. The 68-item Ways of Coping checklist was developed by the authors to measure coping in this study. Results indicated that work situations favored the use of problem-focused coping, and health contexts favored emotion-focused coping. Situations in which the person thought something constructive could be done or that were appraised as requiring more information favored problem-focused coping, whereas those which had to be accepted favored emotion-focused coping. There were no effects associated with age (consistent with Billings & Moos, 1981; Pearlin & Schooler,

1978), and gender differences emerged only in problem-focused coping. Men used more problem-focused coping than women at work and in situations having to be accepted and requiring more information. Contrary to the cultural stereotype, there were no gender differences in emotion-focused coping.

In keeping with the transactional perspective which emphasizes the situational determinants of coping efforts, McCrae (1984) reported on two studies that attempted to assess the influence of losses, threats, and challenges on the choice of coping responses. Analysis of the use of 28 coping mechanisms showed that, across both studies, type of stressor had a consistent and significant effect on the choice of coping mechanisms. Faith, fatalism, and expression of feelings were used especially when subjects had experienced a loss; while wishful thinking, faith, and fatalism were used by subjects facing a threat. A number of mechanisms were used more under conditions of challenge, including rational action, perseverance, positive thinking, intellectual denial, restraint, self-adaptation, drawing strength from adversity, and humor.

Another study by Lazarus and colleagues (Folkman, Lazarus, Gruen, & DeLongis, 1986) examined the relationship between personality factors, primary appraisal, secondary appraisal, eight forms of problem- and emotion-focused coping, and somatic health status and psychological symptoms in a sample of 150 community-residing adults. Appraisal and

coping processes were assessed in five different stressful situations that subjects experienced in their day-to-day lives. The results indicated that personality variables and aggregated appraisal and coping processes had a significant relation to psychological symptoms. The more subjects had at stake (primary appraisal) over diverse encounters, the more they were likely to experience psychological symptoms. Problem-focused coping was negatively correlated with psychological symptoms, whereas confrontive coping was positively correlated.

These relations parallel those found in another study (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986) in which a single stressful encounter and its immediate outcome was the unit of analysis. The relations among cognitive appraisal, coping, and the immediate outcomes of stressful encounters were examined. An intraindividual analysis was used to compare the same person's stressful encounters in order to understand the functional relations among these variables. The findings indicated that coping was related and appraisal was not related to the quality of encounter outcomes. Confrontive coping and distancing were associated with unsatisfactory outcomes, and problem solving and positive reappraisal were associated with satisfactory outcomes.

Coping style has been conceptualized in many different ways. Although there is some overlap, it is difficult to derive one conclusion based on the research available.

Overall, it seems that coping styles which focus on problem solving, self-reliance, and cognitive reappraisals are related to less distress and more satisfaction. Avoiding or ignoring the problem seems to be related to higher distress. There also seems to be some indication that the role sphere in which the coping occurs may be important. This is supported by Lazarus and Folkman (1984), who assert that coping strategies are not inherently good or bad. A strategy that is effective in one situation may not be effective in another. Therefore, the effectiveness of a coping style depends on the extent to which it is appropriate to the demands of the situation.

Social Support

Research has repeatedly substantiated that people of all ages with strong supportive relationships and meaningful ties with others are able to cope better with the stresses of their environment (Christen, 1986). The growing evidence that the presence of, and contact with, others may enable people to cope better with stressors has resulted in increased attention being given during recent years to the mediating variable of social support (Henderson, 1977; Johnson & Sarason, 1979).

Social support has been defined in several ways and involves something more than the mere presence of others. In the most general sense social support refers to the degree to which individuals have access to social resources,

in the form of relationships, on which they can rely, especially in time of need, but at other times as well. These resources might include spouse, family, friends, neighbors, coworkers, and members of the larger community (Lin, Ensel, Simeone, & Kuo, 1979).

Cobb (1976) has defined social support more specifically as information that leads individuals to believe that they are cared for and loved, esteemed and valued, and belong to a network of communication and mutual obligation. Social support has been defined in somewhat different terms by Cassel (1973), and Mechanic (1974), who have observed that social networks serve multiple functions in helping one adjust to the demands of the environment. Caplan (1974) argued that in times of psychological need, social support can provide emotional sustenance, informational guidance, and tangible assistance.

Dean and Lin (1977) suggest that social support may be viewed as being organized around two systems: the instrumental system, which is geared to the fulfillment of tasks, and the expressive system, which is geared to the satisfaction of individual needs and the maintenance of social solidarity. Schaefer, Coyne, and Lazarus (1981) identified three dimensions of social support: emotional support, which involves intimacy and receiving reassurance; tangible support, or the provision of direct aid and services; and informational support, which includes advice

concerning solutions to one's problems and feedback about one's behavior.

At this time, no single conception of social support has received consensual acceptance, though Cobb (1976) and Schaefer et al. (1981) seem to incorporate the important elements of other definitions. There are two other important aspects of these authors' conceptualizations of social support. Cobb (1976) emphasizes that the quality or kind of social support is more important than the quantity. While, Schaefer et al. (1981), in distinguishing quantity versus quality of social support, recommend using the terms social network and perceived social support, respectively. The lack of consensus concerning the definition of social support also is reflected in ambiguities in its measurement. For example, several studies have regarded marital status as the sole indicator of social support, a practice that is clearly simplistic in light of any of the foregoing definitions.

The view that social support is important to a person's health and well-being is not new. In fact some of the most persuasive evidence for the power of social support factors in influencing an individual's susceptibility to physical illness and mortality comes from animal studies (Bell, LeRoy, & Stephenson, 1982). Under conditions of laboratory-induced stress, the presence of the mother, littermates, other animals who were not strangers, or human affection reduced or eliminated such illnesses as arteriosclerotic

heart disease in rabbits (Nerem, Levesque, & Cornhill, 1980), hypertension in mice (Henry & Cassel, 1969), gastric ulcer formation in rats (Conger, Sawrey, & Turrell, 1958), and experimental neurosis in a goat (Liddell, 1950).

Studies on mortality rates in humans have provided evidence for the effects of social support on illness. In the 1950s, Kraus and Lillienfield (1959) concluded from existing medical evidence that married people experienced a lower mortality rate from all causes than did single persons, the widowed, and the divorced for every age group regardless of gender and race. Interestingly, widowers were found to have a death rate three to five times higher than that for married men of the same age for all causes of death.

The relationship between social support and subsequent mortality was replicated by Berkman and Syme (1979). Almost 7000 people were studied and their mortality rate was tracked over a 9-year period. The results confirmed that people who had low social support were more likely to die than were people with high social support. They addressed social support in the broader term of social integration as reflected in marital status, and contacts with close friends and relatives, church membership, or group associations. Although marital status is related to mortality within all age and racial groups, and for both sexes, these and other studies (as reviewed in Turner, 1983) suggest that the apparent protection against stress and illness conferred by marriage is substantially greater for men than women.

Numerous studies have demonstrated links between social support and physical health and illness. Lynch (1977) found personal relationships were significantly associated with lower rates of all types of heart disease. Social support also has been found to interact with life stress to reduce the negative impact of stress on physical health. Nuckolls, Cassel, and Kaplan (1972), in a well-designed study, showed that the pregnancy complication rate was much higher for those women who experienced many life events but had low support scores (as measured by the quality of marital relationship, interactions with extended family, and adjustment within the community) than for those who also experienced many life events but scored high on the social support scale. Gore's (1978) study of unemployed men indicated that strain in the form of elevated cholesterol levels, increased depression, and more frequent illness was considerably lessened among those with supportive marital relations and ties to the extended family and to peer groups.

Social support not only has a beneficial effect on mortality and physical disease, but there also is a growing body of evidence linking social support with psychological distress and disorder. Brown and colleagues (Brown, Bhrolchain, & Harris, 1975; Brown & Harris, 1978) examined the influence of a close confiding relationship in reducing the risk of depression following a major life event or long-term difficulty. Among those women who lacked a confiding

relationship, 38% developed depression compared to only 4% of women with such a confiding relationship. Similarly Eaton (1978), in a new analysis of another data set (Myers, Lindenthal, & Pepper, 1975), found the relationship between life stress and psychiatric symptoms was greater for unmarried persons and those living alone than for individuals who were married or not living alone. Dean and Lin and their associates (Dean & Lin, 1977; Dean, Lin, Tausig, & Ensel, 1980; Lin, Simeone, Ensel, & Kuo, 1979) observed a significant relationship between social support and psychological distress. In one analysis, Lin, Simeone, Ensel, and Kuo (1979) examined the effects of social support and stressors on psychiatric symptoms. Their findings showed, as expected, that stressors were positively related to the incidence of psychiatric symptoms, and social support was more significantly (and negatively) related to psychiatric symptoms.

These studies indicate social support appears to lower the likelihood of illness and to speed recovery of illness when it does occur. Apparently people with high levels of social support may be less likely to develop illness in the first place. Social support does seem to enhance the prospects for recovery for people who are already ill (Wallston, Alagna, DeVellis, & DeVellis, 1983). People with high levels of social support may require less medication (DeAraujo, Van Arsdel, Holmes, & Dudley, 1973) and may recover from illness faster than people with low levels of

social support (Cobb, 1979). However, a number of studies have failed to find differences in illness rates among people with high versus low levels of social support (Wallston et al., 1983), so it may be that social support is more effective in reducing stress than in actually preventing illness.

What, exactly, is the role of social support in moderating the effects of stress? Two possibilities have been extensively explored. The first hypothesis, frequently labeled the "direct effects" or "main effects" hypothesis maintains that social support has a direct beneficial effect regardless of the level of stress. A number of studies report finding primarily main effects (Bell et al., 1982; Schaefer et al., 1981). One study by Andrews, Tennant, Hewson, and Vaillant (1978) examined the contributions of life stress, social support, and coping style to psychological impairment. They found that both social support and stress were independently (rather than interactively) related to psychological impairment in an additive fashion.

The second hypothesis, often called the buffering, mediating, or interaction hypothesis, proposes that social support operates in an interactive fashion with level of stress to modify the effects of stress on health outcomes. Substantial evidence consistent with the buffering hypothesis can be assembled (Fleming, Baum, Gisriel, & Gatchel, 1985; Wethington & Kessler, 1986). Wilcox (1981)

found that the relation between lack of social support and psychological distress increased as a function of the level of life stress the individual had experienced. Under this hypothesis the health and mental health benefits of social support are chiefly evident during periods of high stress; when there is little stress social support may have few physical or mental health benefits. According to this hypothesis, what social support does is act as a reserve and resource that blunts the effects of stress or enables the individual to cope with stress more effectively when it is at high levels or when the individual needs it most.

LaRocco, House, and French (1980) found that social support did buffer the effects of stress on mental and physical health. However, social support did not buffer the effect of stress on job-related strains (job dissatisfaction). Apparently not all manifestations of stress are equally well buffered by social support. For example, in a study of residents near Three Mile Island following the nuclear accident, people with high levels of social support showed less distress and fewer behavioral problems than did people with low levels of social support; however, physiological indicators of stress (arousal) were unaffected by social support (Fleming, Baum, Gisriel, & Gatchel, 1982).

Interestingly, while the mediating role of social support has been extensively suggested, in some cases the buffering hypothesis has been difficult to test convincingly (Gore, 1978; Thoits, 1982). In fact, several investigators

found no significant stress buffering effects of social support on physiological or psychological strain (Andrews, Tennant, Hewson, & Vaillant, 1978; Billings & Moos, 1984; Kobasa, 1982; Schaefer et al., 1981).

It has been difficult to determine whether the effect of social support is direct, a buffering effect, or the result of a third (unknown) factor. For instance, an issue often raised is that loss of social support can be itself a stressor. Persons who live alone and have few social contacts often report degrees of symptomology even when experiencing few stressors. Perception of the need for social support and type of support needed, along with availability, accessibility, and whether or not such support is used, are influenced by developmental or life cycle changes. Bruhn and Philips (1984) proposed that an individual's perception of the need for social support, its availability and accessibility, and whether or not it is used are related to changes in social roles and life events throughout the life cycle. Social support tends to be at a peak, both in terms of need and availability, during middle age, while lower levels are apparent during earlier and later years.

There are a small number of studies that have found different results for the role of social support in mediating stress in men and women (Billings & Moos, 1984; Hammond, 1987; Holahan & Moos, 1982, 1985). Holahan and Moos (1982) found that the work environment was a more

important source of support for men than women, and that the family environment was an especially important source of support for unemployed women. Billings and Moos (1984) generated similar results with 424 males and females entering treatment for depression. Social support was more strongly related to functioning in women, while different sources of support, from coworkers and supervisors in the work environment, were thought to be more important for men's adjustment. Holahan and Moos (1985) found stress resistant women had better family support than women in the distressed group. These authors suggested that these gender-related differences in social support were a function of conventional patterns in sex role behavior in our society.

In a study of 102 male and 111 female academic multiple role persons, Hammond (1987) found no differences by gender on levels of social support perceived from families. However, women perceived significantly more social support from friends than men. Several authors have suggested that Kobasa's (1982) failure to find that social support operated as a stress resistance factor, for the sample of all male lawyers, was because of these observed gender differences in the role of social support.

Health Practices and Exercise

Hardiness, coping style, and social support all have been widely researched as mediating variables in the stress-

illness relationship. Although health practices and exercise have been mentioned frequently as possible buffers of stress, they have been, as of yet, only minimally researched. A thorough literature search generated fewer empirical studies examining the relationship of health practices or exercise in moderating the effects of stress. Health practices is a broad term and includes such factors as nutrition, exercise, sleep, smoking, and alcohol and substance abuse.

As previously mentioned, the cumulative effect of a stressful life can take its toll on the body. People who are in stressful situations may let themselves go, by eating, drinking, or smoking excessively. Heart disease, or arteriosclerosis, is known to be affected by stress. Yet a number of other diseases are also believed to have a significant stress component. Cancer is one of these diseases, with some fascinating research currently being done in an effort to identify cancer-prone personality types. It has long been hypothesized that unhealthy emotions can weaken the body's defense mechanisms whose job it is to interfere with the growth and proliferation of abnormal cells. Distress and emotions also seem to be important contributing factors in hypertension, asthma, allergies, ulcers, ulcerative colitis, and migraine headaches (Cooper, Gallman, & McDonald, 1986).

Health practices. Personal life style, including such factors as exercise, diet, and sleep, has become well

established as a variable affecting health (Coyne & Holroyd, 1982). For example, workers in physically strenuous occupations were found to have lower incidence rates of myocardial infarction (Karvonen, Rautaharju, Orma, Punsar, & Takkunen, 1961) and a lower risk of coronary heart mortality (Paffenberger & Hale, 1975) compared to demographically similar workers in less strenuous occupations. Assessing life style more globally, Pratt (1971) found that a higher quality of personal health practices (e.g., sleep, exercise, nutrition, elimination, dental hygiene, smoking, and alcohol use) was related to a higher subjective level of health and to fewer health problems. Results such as these have led investigators to suggest that the costly toll of many health problems can be reduced through a healthy diet, regular exercise, proper sleep and rest habits, restraint from smoking and alcohol or substance abuse, and reduced risk-taking behavior (Matarazzo, 1982; Pratt, 1971).

Health practices influencing health status also may be modified by stress. Langlie (1977) found that subjects with many demands on their time reported feeling a lack of control and perceived the costs of maintaining good health practices as high. For more direct support, Weisman (1956) reported that peptic ulcer sufferers aggravate their disease by increasing alcohol consumption in response to work stress. Similarly, smokers tend to smoke more during high-stress conditions than during low-stress conditions

(Horowitz et al., 1979; Schachter, Silverstein, Kozlowski, Herman, & Liebling, 1977).

With evidence that stress affects health practices that, in turn, influence health status, it can be hypothesized that health practices mediate the relationship between stress and illness. Although this notion has been suggested previously (e.g., Hinkle, 1974; Jemmott & Locke, 1984), empirical investigation of this relationship has been minimal. To test this hypothesis directly, Pardine et al. (1983) studied the effects of stress and stress-related health behavior departures on subsequent illness. Subjects with higher levels of stress reported poorer normal health practices and more negative health behavior changes. Both life stress and health behavior departures correlated significantly with future illness measures. Path analyses revealed that stress-related health behavior departures contributed as much to the stress-illness relationship as did the independent effect of stress.

Wiebe and McCallum (1986) investigated the joint mediating effects of health practices and hardiness in the stress-illness relationship. Health practices were measured by the Self Care Inventory (Pardine et al., 1983). The 40-item questionnaire assessed a variety of positive and negative behaviors related to dietary practices, hygienic practices, recklessness, substance abuse, and exercise. The 60 female and 26 male undergraduate subjects were asked to indicate the frequency with which each behavior occurred in

the past month on a four-point scale ranging from "never" to "most of the time." Higher scores represented poorer health practices. Path analysis techniques were utilized to explore the relationship among stress, hardiness, health practices, and illness. Results showed that stress exerts its effects by changing health practices in addition to the direct effect on illness. Apparently individuals who become ill after experiencing a stressor may do so partially because they do not maintain good health behaviors. The direct impact of health practices on illness was as strong or stronger than that of hardiness. However, the greatest effect comes from the indirect effect of hardiness on health practices. Apparently hardy individuals maintain better health practices while experiencing stress than do nonhardy individuals. The authors recommended more research on the mediational role of health practices.

Exercise. Many hopes have been placed upon exercise as a protector of health. The evidence available is not complete regarding cardiovascular disorders. Generally, the studies are longitudinal, first obtaining self-report measures of exercise level and then checking periodically for evidence of heart symptoms. The consensus of these studies (Epstein, Miller, Stitt, & Morris, 1976; Paffenberger & Hale, 1975) appears to be that exercise decreases the likelihood of heart attacks. Even among subjects showing constitutional risk factors, those who exercised had fewer heart attacks than those who were

sedentary. Apparently, the beneficial effect of exercise is not restricted to sports (i.e., jogging, tennis), but includes physical labor as well (e.g., Paffenberger & Hale, 1975).

Explanations of these results (e.g., Boyer, 1972; Epstein et al., 1976; Paffenberger & Hale, 1975) begin with vigorous exercise increasing the efficiency of cardiac action, slowing the heart, and regularizing rhythm. Further, levels of energy expenditure probably increase fibromolytic activity and, finally, increase collateral circulation of the luminal area of coronary arteries. In this fashion, exercise can protect health by decreasing organismic strain as the result of stressful life events. These speculations are based on some evidence that inactivity is associated with cardiac arrhythmia and other signs of circulatory impairment (Karkoven, Rautaharju, Orma, Pensar, & Taakunen, 1961). The evidence that exercise protects against other illnesses is less clear, though it has been implicated in that fashion (e.g., Weiner, 1977). Exercise seems a promising enough buffer to justify additional attempts to determine its role with other possible mediators in protecting health.

Kobasa, Maddi, and Puccetti (1982) examined exercise and hardiness as independent buffers of the stressful event-illness relationship. Using a self-developed measure of exercise, the authors found that hardiness and exercise each interacted with stressful events in decreasing illness in

137 business executives. Their buffering effects seem additive in that persons who both were hardy and exercised were the healthiest. Exercise buffered stress by decreasing the organismic strain produced by stressful events. The authors identified exercise as an important resistance resource against illness. They also recommended future research focusing on the complementary stress-resistance effects of hardiness, exercise, and another resource such as perceived social support.

Although Kobasa (1982) studied the role of exercise in stress resistance among lawyers, it was not found to significantly affect the degree of strain reported. The lack of any affect from exercise probably had less to do with lawyers than with the simple way in which physical fitness was measured. Lawyers were asked how many hours a week they currently spent in aerobic exercise. No history of physical fitness was obtained. Kobasa proposed that maybe only exercise over a long period of time increases stress resistance, and that future research should employ a more sophisticated measure of fitness.

Summary

Stress, from the psychosocial research perspective, only exists when the person experiencing it defines it as such. Hence, no events are universally stressful. Although dentistry is widely recognized as a high stress occupation, not all dentists suffer from the higher than average rates

of physical and psychological symptoms that are considered the outcomes of high stress.

Of the three major theoretical models of stress, one, the transactional model, focuses on both stressors and stress response. It allows for individual differences by including mediating factors (such as hardiness, coping style, social support, and health practices) in the model, which may help explain why all people under stress do not experience ill effects. Furthermore, it considers positive outcomes such as morale and satisfaction, rather than focusing only on negative outcomes such as psychological symptoms or physical illness. Thus, the transactional model seems best suited to guide research on the complex relationship between stress and its outcomes of strain and satisfaction in practicing dentists.

CHAPTER III
METHODOLOGY

The purpose of this study was to describe stress and the role of stress resistance resources in male dentists. Specifically, using the transactional model of stress, the relative mediating effects of hardiness, coping style, social support, and health practices in the stressors-strain/satisfaction relationship in male dentists were explored. The research questions, population and sample, instruments, data collection procedures, data analysis procedures, and limitations of this study are presented in this chapter.

Research Questions

Research Question One. How can male dentists be described in terms of their demographic characteristics, dental stressors, hardiness, coping styles, social support and health practices, strain, and career and general life satisfaction?

Research Question Two. Do male dentists with different demographic characteristics differ with regard to their stressors, hardiness, coping style, and social support and health practices, as well as the level of strain and career and general life satisfaction they experience?

Research Question Three. Considering the demographic characteristics, stressors, hardiness, coping style, social support, and health practices, what is the optimal set of variables for predicting the level of strain in male dentists?

Research Question Four. Considering the demographic characteristics, stressors, hardiness, coping style, social support, and health practices, what is the optimal set of variables for predicting the level of career and general life satisfaction in male dentists?

Research Question Five. Which of the variables, stressors, hardiness, coping style, social support, and health practices, is significantly related to strain and career or life satisfaction among male dentists when the effects of other variables are held constant?

Population and Sample

The population for this study was male dentists actively practicing in the state of Florida. In September 1987 there were approximately 8000 licensed dentists in the state, although not all of these were male or actively practicing. In May 1988 there were 4849 dentists who were members of the Florida Dental Association (FDA), which represented about 80% of the actively practicing dentists in the state.

The FDA offers access to the membership mailing list for a fee. Mailing lists can be purchased according to

alphabetical listing, zip code areas, or practice specialty. For this study, the entire mailing list was used.

Names of potential participants were randomly selected from the current membership roster of the FDA. Starting at the top of the list every name was assigned a number, then using a computer generated random number table, 500 names were selected from the list for the initial mailout. If an obviously female name was selected, another name was selected to take its place using the same procedure. The survey was mailed during the summer of 1988.

The sample selected represented approximately 10% of the current membership of the FDA. No attempt was made to stratify the sample, but the respondents' demographic characteristics were examined to determine if the responding group was representative of Florida dentists according to other reported statistics on race, age, years in practice, and specialization.

The final research sample included 251 dentists who returned questionnaires properly completed. Of the respondents not included in the final sample, nine were retired from active practice, three did not adequately complete the instruments, four were returned after the data analyses were completed, two did not meet the criteria for inclusion, two did not wish to participate, two were returned by the Post Office as undeliverable, one was deceased, one was disabled, and 228 did not respond. The return rate of over 50% in slightly over three weeks with only one follow-up reminder was quite high for a random mail

survey. Completing the questionnaire required about 15 to 30 minutes for the average participant.

Instruments

The respondents were asked to complete eight paper-and-pencil self-report questionnaires with a total of 180 items covering stressors, strain, career satisfaction, general life satisfaction, hardiness, coping styles, social support and health practices, and demographic information. The instruments were the Strain Questionnaire, Dental Career Satisfaction Index, Index of Well Being, Dental Stress Inventory, Hardiness Test, Coping Responses, Vulnerability Scale of the Stress Audit, and Demographic Questionnaire. The questionnaires assessing strain level, vulnerability to stress, and hardiness are copyrighted and are available from their authors. A copy of all other questionnaires can be found in Appendix A.

The Strain Questionnaire

The Strain Questionnaire (SQ) (Lefebvre & Sandford, 1985) was used to measure strain or the stress response in the participants. The SQ is a 48-item self-report paper-and-pencil test which conceptualizes strain as a syndrome of physical, behavioral, and cognitive symptoms that are elicited, to varying degrees, by environmental demands upon an individual. This syndrome is relatively independent of concomitant emotional states (e.g., anxiety or depression),

and is not severe or chronic enough to have resulted in clinical diagnoses. On the SQ respondents are asked to rate how often in the last week they experienced each of the 48 symptoms by responding "never," "once or twice," "three or four times," "five or six times," or "every day." Responses are assigned numerical equivalents (1-5) and summed to obtain a total score and scores on each of the subscales.

The SQ yields scores on three subscales (physical, behavioral, and cognitive), plus the full scale score. Twenty-eight questions address physical signs of strain, such as backaches and insomnia, 12 questions cover the behavioral symptoms, such as spending more time alone and being accident prone, and the final eight questions assess cognitive symptoms such as believing the world is against you.

Initial reliability and validity studies have been conducted on the SQ. Tests of reliability on the SQ have been conducted by (Lefebvre & Sandford, 1985) based on a total sample of 412 subjects, including male and female insurance agents, elementary and secondary school teachers, graduate business students, naval engineers, and undergraduate students. These tests include internal consistency (Cronbach's alpha), and test-retest over a period of one month.

The full scale had an alpha coefficient of .94 and test-retest correlation of .79. Alpha coefficients were reported to be .71 for the behavioral subscale, .86 for the

cognitive subscale, and .92 for the physical subscale. Test-retest reliabilities included .73 for the cognitive subscale, .75 for the physical subscale, and .77 for the behavioral subscale (Lefebvre & Sandford, 1985).

Concurrent validity was established on the SQ using a sample of 68 business students (Lefebvre & Sandford, 1985). Correlations between the SQ, its three subscales, and the Beck Depression Inventory (BDI) were all significant, ranging from .63 to .78. These data indicate a moderate degree of shared variance by the two instruments which is primarily attributable to the overlap of cognitive symptoms.

Further evidence of validity was established by comparing subgroups of the sample who were considered to be under somewhat stressful conditions with subgroups that were not when they completed the SQ. For the SQ and the cognitive and behavioral subscales, the nonstressed group scored significantly lower than any of the other subgroups. On the physical subscale, the nonstressed group and one of the stressed groups both scored significantly lower than the remaining three stressed groups.

While still being researched, the SQ is one of the few brief, self-report instruments available to measure strain which has empirical evidence of reliability and validity. It takes into account more than just the physical symptoms of strain by including behavioral and cognitive items. Furthermore, it is designed for use with non-clinical populations.

The Dental Career Satisfaction Index

Satisfaction with one's dental career was assessed using a 6-item scale created by Katz (1981). The Dental Career Satisfaction Index (DCS) was designed to measure the degree to which dentists felt successful and satisfied with their choice of dentistry as a career. The concept of feeling successful in one's career has been proposed as one of the critical components of job satisfaction (Campbell, Converse, & Rodgers, 1976; Osherson & Dill, 1983).

On one question the respondents were asked to indicate the degree to which they feel they are successful in their profession when compared to the "average" dentist. Two other questions were designed to assess the desire to escape from dental practice either through participating in some other aspect of dentistry or leaving the profession altogether. The scale used a Likert-type response format, ranging from 0 (very unhappy) to 10 (very happy). For this study, the response format was changed to a 1 to 5 Likert scale, in order to be consistent with the other instruments used.

Several investigators have found that changing the number of response categories does not affect the internal consistency (Bendig, 1954; Komorita, 1963), predictive validity, concurrent validity, or test-retest reliability (Jacoby & Matell, 1971) of the instrument. Items were responded to on a scale of 1 to 5 (disagree to agree), yielding a total score ranging from 6 to 30.

Katz (1981), using a sample of 291 dentists in Texas, reported an internal consistency coefficient (Cronbach's alpha) of .77 for the DCS. Item-total correlations for the DCS ranged from .38 to .65 with a mean of .56. Unfortunately, no further reliability or validity information was available for the DCS.

The Index of Well-Being

The Index of Well-Being (IWB), developed by Campbell et al. (1976), is a nine-item instrument that was used to measure general life satisfaction. Eight of the items use a semantic differential technique with a 7-point rating scale. Respondents were asked to describe their "present life" by checking a point on the scale between two adjective poles. For example, respondents chose a point between "enjoyable" and "miserable," and between "discouraging" and "hopeful." The ninth item asked, "How satisfied are you with your life as a whole these days?" and was responded to on a 7-point Likert-type scale, ranging from "completely dissatisfied" to "completely satisfied."

Scores on the IWB were calculated by first assigning values (1-7) to the points on each item, with 1 being the least favorable response and 7 the most favorable. Then, the mean of the first eight items was computed. Next, the score on the ninth item was weighted by multiplying it by 1.1. Finally, the total score was computed by adding the mean of the first eight items to the weighted ninth item.

Thus, the IWB gave considerably more weight to the overall life satisfaction item than to any of the semantic differential items taken alone (Campbell et al., 1976).

Campbell et al. (1976), using a national sample of over 2000 people, reported an internal consistency coefficient of .89 for the IWB. Intercorrelations of the first items ranged from .40 to .61. A principal components factor analysis employing varimax rotation of the correlations among the first eight items revealed that they jointly define the first and only factor. Test-retest reliability for the IWB over an 8-month period was reported to be .53 (Campbell et al., 1976).

The Dental Stress Inventory

The Dental Stress Inventory (DSI) (Katz, 1981) was used to measure stressors or the degree to which dentists perceive themselves to be under stress in their work environment. The DSI consists of 15 items, 14 designed to reflect various aspects in the work experience of the practicing dentist which have been hypothesized to be stressful for many practitioners. The last item asks "Overall, how stressful do you find the practice of dentistry?" The scale uses a Likert response format ranging from 0 (strongly disagree) through 10 (strongly agree).

For this study, the response format was changed to 1 to 5 in order to be consistent with the other instruments used. As previously mentioned, several researchers have found that

changing the number of response categories does not affect the internal consistency (Bendig, 1954; Komorita, 1963), predictive validity, concurrent validity, or test-retest reliability (Jacoby & Matell, 1971) of the instrument. The total score ranged from 15 to 75.

Katz (1981) found the DSI had an internal reliability coefficient of .84 and a consistently good item-total correlation ranging from .29 to .73. Validity was established on the DSI using a sample of 34 dentists (Katz, 1981). Subjects filled out the DSI and a measure of general life stressfulness, the General Stress Index (GSI), used by Kobasa (1979). This 6-item scale determined the extent to which respondents found stressful each of the following general areas of life: work, financial concerns, social/community involvements, interpersonal relationships, family, and personal or inner-life concerns. The correlation between the two instruments was almost zero, supporting the presumption that the DSI is a pure measure of stress in dentistry as perceived by the practitioner.

The Hardiness Test

The Hardiness Test (HT) (Kobasa, Maddi, & Kahn, 1982) was used to measure the degree to which the individual has a hardy personality. The hardy personality as conceptualized by Kobasa, Maddi, and Puccetti (1982) is defined as possessing feelings of control, commitment, and challenge. Control concerns the feeling and belief that life events may

be influenced by the self rather than feeling helpless when confronted with adversity. Commitment reflects a generalized sense of purpose and meaningfulness that is expressed as a tendency to become actively involved in events rather than remaining passively uninvolved. Challenge suggests that life events are perceived not as an onerous burden by which one is weighed down, but instead as a normal part of life that provides opportunity for development (Ganellan & Blaney, 1984).

Originally, hardiness, being a multifaceted personality style, was measured by five scales combined into a composite score (Kobasa, Maddi, & Kahn, 1982). Commitment was measured by items for the alienation from self and alienation from work scale items of the Alienation Test (Maddi, Kobasa, & Hoover, 1979), employed as a negative indicator. Strong agreement with the alienation from self items indicates a lack of the self-recognition and fundamental sense of purpose associated with the committed person. High scores on the alienation from work scale indicate a lack of personal investment in that area of life involving socially productive occupation and signal an absence of that engagement and accountability definitive of commitment. An emphasis on challenge was measured negatively by the items from the security scale of the California Life Goals Evaluation Schedule (Hahn, 1966). This true-false scale measures the degree to which safety, stability, and predictability are deemed important. Persons

scoring high on this scale are unlikely to perceive changes as stimulating challenges to growth. An attitude of personal control was measured negatively by items from the external locus of control scale (Rotter, Seeman, & Liverant, 1962) and the powerlessness scale of the Alienation Test (Maddi et al., 1979).

The most recent (third generation) Hardiness Test contains 50 items from these five scales to form a composite that has shown moderately high intercorrelations between scales (ranging from .17 to .74) and jointly define the first and only large factor in a principal components factor analysis (Kobasa, Maddi, & Puccetti, 1982). As to the reliability of the HT, estimates of internal consistency have yielded coefficient alphas in the .90s for total hardiness score, and in the .70s for commitment, control, and challenge scores. Stability appears to be in the .60s over periods of two weeks or more (Kahn, 1986). In addition, the hardiness composite has shown a stability correlation of .61 over a 5-year period (Kobasa, 1982). The test is scored by the Hardiness Institute, yielding a total hardiness score plus scores for each of the three subscales of commitment, challenge, and control.

Coping Responses

Coping style was assessed using an instrument on Coping Responses developed by Billings and Moos (1981). This instrument is designed to determine how respondents

cope with a specific conflict or problem using 19 yes or no items. In this study, subjects were asked to respond to "a typical problem you have faced recently in your work as a dentist."

The items can be grouped into three method of coping categories: active-cognitive, active-behavioral, and avoidance. Active-cognitive coping includes attempts to manage one's appraisal of the stressfulness of the event, such as "tried to see the positive side of the situation" and "drew on my past experience in similar situations." Active-behavioral coping refers to overt behavioral attempts to deal directly with the problem and its effects, such as "tried to find out more about the situation" and "took some positive action." Avoidance coping refers to attempts to avoid actively confronting the problem (for example, "prepared for the worst" and "kept my feelings to myself") or to indirectly reduce emotional tension by such behaviors as eating or smoking more (Billings & Moos, 1981).

The items also may be grouped into two focus of coping strategies: problem-focused and emotion-focused. Problem-focused coping includes attempts to modify or eliminate the sources of stress through one's own behavior. Emotion-focused coping includes behavioral or cognitive responses whose primary function is to manage the emotional consequences of stressors and to help maintain one's emotional equilibrium (Billings & Moos, 1981). The score

for each coping measure is the percentage of items answered "yes."

Given the underlying assumptions of reliability theory (Guttman, 1945), typical psychometric estimates of internal consistency may have limited applicability in assessing the adequacy of measures of coping (Hartmann, Roper, & Bradford, 1979; Zuckerman, 1979). An upper limit may be placed on internal consistency coefficients by the fact that the use of one coping response may be sufficient to reduce stress and thus lessen the need to use other responses from either the same or other categories of coping. Bearing this in mind, internal consistencies (Cronbach's alpha) of the method of coping categories were .72 for active-cognitive coping, .80 for active-behavioral coping, and .44 for avoidance coping. The intercorrelations among the three coping categories are relatively low (the average correlation coefficient is .21), indicating that the categories are relatively independent. Adequate internal consistency and independence of the focus of the coping categories have been demonstrated by Folkman and Lazarus (1980).

The Vulnerability Scale of the Stress Audit

The Vulnerability Scale (VS) from the Stress Audit (Miller & Smith, 1983) was used to assess social support and health practices. The Stress Audit is a 238-item self-administered paper-and-pencil instrument. The VS consists

of 20 questions which ask respondents to rate the frequency of occurrence of certain behaviors or situations which affect one's vulnerability to stress. Vulnerability items are rated from 1 (almost always) to 5 (never), which indicate the frequency of specific health-related behavior. Items sample eating, sleep, exercise, and recreational habits, alcohol, caffiene and tobacco use, ability to express emotions, and social and spiritual resources. The VS is scored by summing the circled numbers. Scores range from 20 to 100.

For this study, the response format was changed to 1 (never) to 5 (almost always) in order to be consistent with the directional values (low to high) of the other instruments used. As previously mentioned, several researchers have found that changing the response categories does not affect the internal consistency (Bendig, 1954; Komorita, 1963), predictive validity, concurrent validity, or test-retest reliability (Jacoby & Matell, 1971) of the instrument.

Initial reliability studies on the VS have been reported by Miller, Smith, and Mehler (1984) based on a total sample of 559 subjects, including nurses, graduate students, and college freshmen. The reported test-retest reliabilities on the VS were .88 for 64 nurse employees of a university hospital, tested one week apart; .84 for 52 graduate students in professional psychology, tested two weeks apart; and .62 for 443 college freshmen, tested six

weeks apart. Unfortunately, no other reliability or validity information was available for the VS.

Demographic Questionnaire

Twelve questions on a Demographic Questionnaire were used to gather demographic data and to attempt measurement of a number of factors purported to be related to the dentist's stress by various authors in the dental literature as previously reviewed. Questions covered information on subjects' gender, marital status, age, race, religious preference, years in practice, specialty, and type of practice (solo vs. group). Additional questions included the number of days of continuing education taken per year, average frequency of staff meetings, annual gross income from dentistry, and role of spouse in the practice.

Data Collection

The basic plan for conducting the mail survey was in accordance with the recommendations of Dillman (1977). The questionnaire packet was designed to meet, as closely as possible, Dillman's specifications. Instruments were reduced and combined into a booklet format. The packet was sent to the selected dentists along with an introductory letter from a dentist and an explanatory cover letter which included a brief description of the purpose of the

study (see Appendix B) and a stamped, addressed return envelope.

Subjects' names were not placed on the questionnaire to ensure confidentiality. Each packet was given a code number which was paired with a respondent's name on a separate listing, allowing for follow-up of packets that were not returned while still protecting confidentiality.

One week from the day of the original mailout, a follow-up postcard was sent thanking those who had completed the questionnaire and urging those who had not to do so. When sufficient returns (120 subjects) had been received, the data were analyzed according to the procedures described below. Those subjects who requested follow-up information were sent a summary of the findings from the study upon completion of the analysis of the data.

Data Analysis

Means and standard deviations, or frequencies and relative frequencies, were used to describe male dentists in terms of their demographic characteristics, dental stressors, hardiness, coping styles, social support and health practices, strain and career and general life satisfaction. Means and standard deviations also were used to describe male dentists by the various demographic characteristics and categories by stressors, satisfaction, coping styles, social support and health practices, strain and career and life satisfaction. Analysis of variance was

used to determine if male dentists differed demographically regarding their stressors, hardiness, coping style, social support and health practices, as well as level of strain and amount of career and general life satisfaction.

Stepwise multiple regression analysis was used to determine how demographic characteristics, stressors, hardiness, coping style, and social support and health practices relate to the level of strain in male dentists. Stepwise multiple regression analyses also were used to determine how demographic characteristics, stressors, hardiness, coping style, and social support and health practices relate to career and general life satisfaction in male dentists. In all, three stepwise multiple regression analyses were used with strain, career satisfaction, and general life satisfaction representing the criterion variables in each regression equation. Stepwise multiple regression analysis was used to determine the relative importance of hardiness, coping style, and social support and health practices as mediating variables in the stressors-strain/satisfaction relationship in male dentists.

Limitations of the Study

This study, as with all descriptive studies, must be interpreted with caution because of the limitations of sampling procedures and the instruments. Although the method involved random selection of male participants, a sampling bias due to self-selection could be present,

because of the voluntary nature of participation. Also participants were actively involved in practicing dentistry and were members of the FDA. Therefore, the results may not generalize to dentists who are not members of the state association or to dentists in other states. Also, results cannot be generalized to female dentists.

The instruments that were used in this study may be a possible limitation. Efforts were made to use instruments for which reliability and validity were previously established; however, self-report questionnaires are inherently limited by the desire and ability of the participants to answer them accurately and truthfully.

CHAPTER IV
RESULTS AND DISCUSSION

Results

The purpose of this study was to describe stress and the role of stress resistance resources in male dentists. Using the transactional model of stress, the relative mediating effects of hardiness, coping style, social support, and health practices in the stressors-strain/satisfaction relationship in male dentists were explored. The sample consisted of 251 male dentists who were actively involved in practicing dentistry in the state of Florida. Frequencies, means, standard deviations, analyses of variance, stepwise multiple regression, and simple linear regression were used to analyze the data.

Research Question One

The first research question concerned the distributions of several demographic characteristics for male dentists. Specific variables of interest were dental stressors, hardiness, coping styles, social support, health practices, strain, and career and general life satisfaction. Frequencies and relative frequencies were tabulated for most of the demographic variables (with the exception of age

and number of years in practice) and are presented in Table 1. Means and standard deviations were computed for age, number of years in practice, and the other variables and are presented in Table 2.

As the data in Tables 1 and 2 show, the average male dentist in this study was 46 years old, had been in practice 19 years, was white, married, and a general practitioner in solo practice. The data also reflect that participants reported an average of 64.91 on the strain questionnaire, which had a possible range of 48 through 240. This is below the adult norm of 86 (SD = 25) reported by the authors of this instrument (Lefebvre & Sandford, 1985). The participants reported a mean general life satisfaction level of 11.52 on a possible scale of 2.1 through 14.7. This is very similar to the adult norm of 11.77 (SD = 2.2) reported by Campbell, Converse, and Rogers (1976). On hardiness, the respondents scored a mean score of 71.58 on a scale of 0 through 100, which compares to a mean of 76.63 for males in the norm group. Unfortunately the other instruments did not have norms.

The participants' mean ratings of social support were 30.01, and the mean score on health practices was 32.36, both on scales of 8 to 40. The measure of coping style yielded three separate, independent scores: active-cognitive coping, active-behavioral coping, and avoidance coping. For each of the three coping styles, a score was obtained by dividing the number of items the participant

Table 1

Frequency and Relative Frequency Distributions of Demographic Variables

	f	%
Race (N = 249)		
Black	3	1.2
Hispanic	6	2.4
White	240	96.4
Gender (N = 251)		
Males	251	100
Religion (N = 247)		
Catholic	48	19.4
Protestant	119	48.2
Jewish	57	23
Other	5	2
None	18	7.3
Marital Status (N = 251)		
Never Married	12	4.8
Married	221	88
Separated	2	.8
Divorced	14	5.6
Widowed	2	.8
Type of Practice (N = 250)		
Solo Practice	172	68.8
Associateship	16	6.4
Partnership	35	14
Group Practice	22	8.8
Clinic	0	
Military	0	
Public Health	3	1.2
Dental Education	2	.8
Practice Specialty (N = 250)		
General Dentistry	192	76.8
Orthodontics	19	7.6
Pedodontics	7	2.8
Periodontics	9	3.6
Endodontics	11	4.4
Oral Surgery	10	4
Prosthodontics	2	.8

Table 1 continued

	f	%
Days of Continuing Education Courses Taken Per Year (N = 250)		
None	1	.4
1 to 5	43	17.2
6 to 10	91	36.4
11 to 15	58	23.2
16 to 20	26	10.4
Over 20	26	12.4
Annual Net Income from Dentistry in 1987 (N = 242)		
Less than $50,000	37	15.3
$51,000 to $75,000	72	29.8
$76,000 to $100,000	56	23.1
$101,000 to $150,000	50	20.6
$151,000 to $200,000	11	4.5
Average Frequency of Staff Meetings (N = 250)		
Almost Never	43	17.2
Occasionally	98	39.2
Monthly	56	22.4
Biweekly	17	6.8
Weekly	23	9.2
Daily	13	5.2
Role of Spouse in Practice (N = 250)		
None	81	32.4
Advisor/Consultant	32	12.8
Occasional Fill-in Work	29	11.6
Part-time Staff Member	50	20
Full-time Staff Member	34	13.6
Not Married	24	9.6

Table 2

Means and Standard Deviations of Predictor and Criterion Variables

Variable	Mean	SD	Possible Range
Age	46.38	11.36	27-81
Years in Practice	18.93	11.43	1-52
Stressors	39.80	9.06	15-75
Hardiness	71.58	8.52	0-100
Active-Cognitive Coping	.85	.14	0-1
Active-Behavioral Coping	.56	.18	0-1
Avoidance Coping	.33	.22	0-1
Social Support	30.01	6.71	8-40
Health Practices	32.36	5.16	8-40
Strain	64.91	13.58	48-240
Career Satisfaction	17.75	3.60	6-30
Life Satisfaction	11.52	2.09	2.1-14.7

answered "yes" by the total number of items for that scale. The respondents reported using the highest percentage of active-cognitive coping style (.85), followed by active-behavioral (.56), and avoidance coping (.33). The mean on the stressors measure was 39.80, and the mean career satisfaction score was 17.75. These results mean that the male dentists in this study were not experiencing high strain and they were well satisfied with both their careers and life in general.

Research Question Two

The focus of research question two was whether male dentists with different demographic characteristics also differed with regard to stressors, hardiness, coping style, social support, and health practices, as well as the level of strain and career and general life satisfaction they experience. This question was answered by using analyses of variance to compare the demographic characteristics of religious preference, marital status, type of practice, practice specialty, number of days of continuing education courses taken per year, annual net income from dentistry, number of years in practice, frequency of staff meetings, and role of the spouse in the practice with the previously mentioned variables. In all, a total of 90 one-way analyses of variance were conducted.

Using the frequency distributions as a guide, the demographic characteristics were combined into several

smaller categorical groups. Religious preference was limited to three groups: Catholic, Protestant, and Jewish. Marital status was divided into two groups: married and not married. Type of practice was also divided into two groups by dentists in solo practice and dentists who practiced with someone else. The practice categories of clinic, military, public health, and dental education were dropped. Practice specialty became two groups, general practitioners and specialists. Days of continuing education courses taken per year was collapsed from 6 to 4 groups by 0 to 5 days per year, 6 to 10 days per year, 11 to 15 days per year, and 16 or more days per year. The variable of annual net income was divided into two groups: "less" included those earning $75,000 or less and "more" included those earning $76,000 or more.

Number of years in practice was divided into two groups: "less" included those with 24 years or less and "more" included those with more than 24 years in practice. Frequency of staff meetings was collapsed into two groups: the "rarely" category included those participants who answered "almost never" and "occasionally," while the "regular" category included those participants who answered "monthly," "biweekly," "weekly," and "daily." Responses to the item of role of the spouse in the practice were combined into three categories: "none"; "some," which included "advisor/consultant" and "occasional fill-in work"; and "lots," which included both "part-time" and "full-time staff member."

The analyses of variance indicated significant effects of religious preference on both career satisfaction and social support. There was a significant main effect of religious preference on career satisfaction, $F(2,221) = 4.15$, $p < .05$. Scheffé's multiple comparison test was used to determine the means between which significant differences existed. It was found that Protestant dentists reported a significantly higher career satisfaction mean, 18.24, than the 16.68 mean of Jewish dentists. There also was a significant main effect of religious preference on social support, $F(2,218) = 4.41$, $p < .05$. Scheffé's multiple comparison test also was used to determine the means between which significant differences existed. It was revealed that Protestant dentists reported a significantly higher social support mean 31.52, than the 28.40 mean for Jewish dentists. The Protestant dentists reported significantly higher means on both career satisfaction and social support than did the Jewish dentists.

There was a significant main effect, according to the analysis of variance, of marital status on life satisfaction, $F(1,245) = 5.93$, $p < .05$. The mean score was 11.63 for married dentists, which was significantly greater than the mean score of 10.64 for unmarried dentists. These results indicate that married dentists reported significantly higher life satisfaction than non-married dentists.

Results of the analysis of variance revealed significant main effects of type of practice on active-behavioral coping, $F(1,243) = 4.07$, $p < .05$. The mean score for the dentists in solo practice was 3.83, which was significantly lower than the mean score of 4.19 for dentists who practiced with someone else. The dentists who practiced with someone else showed a positive increase in active-behavioral coping. There also was a significant main effect of type of practice on health practices, $F(1,238) = 5.24$, $p < .05$. The dentists who practiced with someone else had a significantly higher mean score 33.56, than the mean of 31.89 for dentists in solo practice. This means that dentists who practiced with someone else (rather than alone) showed an increase in the use of active-behavioral coping and health practices.

The analysis of variance demonstrated a significant main effect of practice specialty on stressors, $F(1,247) = 6.49$, $p < .01$. General dentists had a higher mean score 40.57, on stressors than the specialist mean of 37.12. As expected, general practice dentists had higher stressors (demands) than did the specialists.

A significant main effect was discovered for days of continuing education on active-behavioral coping, $F(3,246) = 3.65$, $p < .01$. Scheffé's multiple comparison test was used to determine the means between which significant differences existed. Results indicated the mean score of 4.33 on active-behavioral coping, for dentists who took 11 to 15

days of continuing education courses per year, was significantly greater than the mean score of 3.71 for the group taking 6 to 10 continuing education courses per year. Another significant main effect was found for number of days of continuing education courses taken per year on hardiness. Results of the Scheffé multiple comparison test revealed significant differences in mean hardiness scores between the dentists taking 0 to 5 days of continuing education courses per year mean 68.49, and the dentists taking 11 to 15 days per year, mean 73.31. The dentists with the least days of continuing education had significantly lower hardiness scores than did the dentists in the 11 to 15 day group.

Analysis of variance findings were significant for income on both career satisfaction and hardiness. A significant main effect was found for income on career satisfaction $F(1,249) = 10.23$, $p < .01$. As expected, the higher income group reported significantly greater career satisfaction ($M = 18.42$) than did the lower income group ($M = 16.99$). A marginally significant main effect also was found for income on hardiness, $F(1,248) = 3.63$, $p = .058$. The higher income group showed a marginally significant higher hardiness level ($M = 72.55$) than did the lower income group ($M = 70.50$).

Additional analyses of variance revealed significant effects of number of years in practice on both stressors and life satisfaction. The dentists were divided into two groups: those with 24 years or less in practice and those

with more than 24 years in practice. There was a significant main effect of years in practice on stressors, $F(1,248) = 8.00$, $p < .05$. Dentists with fewer years in practice had significantly higher mean stressor scores, 40.84, than did the dentists with more years in practice, mean score 37.34. Another significant main effect was found with years in practice on life satisfaction, $F(1,245) = 5.22$, $p < .05$. The mean score for dentists with more years in practice was 11.99, which was significantly higher than the mean score of 11.32 for dentists with less years in practice. Apparently the dentists with less years in practice showed higher stressors and lower life satisfaction, while conversely dentists with more years in practice had lower stressors and higher life satisfaction.

The frequency of staff meetings had significant main effects with several variables and are reflected in Table 3. The data indicate that dentists who have regular staff meetings report significantly higher career satisfaction, life satisfaction, hardiness, and health practices, as well as significantly less cognitive strain and marginally significant more social support than dentists who rarely meet with their staffs.

Another variable, role of the spouse in the practice, had significant main effects with many variables. The results are displayed in Table 4. It should be noted that the Scheffé multiple comparison test did not reveal significant mean differences in strain or avoidance coping.

Table 3

Analyses of Variance of Frequency of Staff Meetings on Other Variables

Source of Variation	Degrees of Freedom	F-Ratio	p	Means for Frequency of Staff Meetings	
				Rarely	Regularly
Career Satisfaction	1,248	11.38		17.09	18.61
Life Satisfaction	1,244	4.39		11.27	11.83
Cognitive Strain	1,247	4.06		9.71	8.97
Hardiness	1,247	9.78		70.14	73.49
Health Practices	1,243	4.50		31.75	33.15
Social Support	1,245	3.60	.059	29.28	30.90

$p < .05$, unless otherwise stated

Table 4

Analyses of Variance of Role of Spouse in the Practice on Other Variables

Source of Variation	Degrees of Freedom	F-Ratio	p	Means for Role of Spouse None	Some	Lots
Life Satisfaction	2,220	5.58	< .01	10.97_a	11.69_{ab}	12.04_b
Strain	2,223	2.75	= .06	68.07	54.11	63.35
Cognitive Strain	2,222	5.53	< .01	10.23_a	9.44_{ab}	8.71_b
Stressors	2,223	3.77		39.33_{ab}	37.54_b	41.69_a
Hardiness	2,222	4.76	= .0095	69.11_a	73.01_b	
Active-Behavioral Coping	2,223	4.37		3.71_a	4.36_b	3.93_{ab}
Avoidance Coping	2,223	3.07		1.89	1.51	1.50

$p < .05$, unless stated otherwise

Note: Means with different subscripts differ significantly, based on Scheffé's multiple comparison test.

This is most likely because Scheffé's test is the most conservative of all the multiple comparison tests. However, the analyses of variance did reveal significant differences between the high and low means.

The data indicate that dentists in the "none" category (where spouses had no involvement in the practice) show significantly less life satisfaction and hardiness and significantly more cognitive strain, avoidance coping, and strain (marginally significant) than the dentists in the "lots" category (spouse involved as part-time or full-time staff member). The data also reveal that for stressors the significant difference is that dentists in the "lots" category show significantly higher stressors (demands) than the dentists in the "some" category (spouse involved as advisor/consultant or occasional fill-in work). For active-behavioral coping the significant difference is between "none" and "some," with dentists with "some" spouse involvement using significantly more of the active-behavioral coping style than the participants in the "none" category.

Research Question Three

The topic addressed in research question three was the relationship of demographics, stressors, hardiness, coping style, social support, and health practices to the level of strain in male dentists. For this question stepwise

multiple regression analysis was used. Strain, a continuous variable, was the criterion variable and stressors, avoidance coping, hardiness, social support, and role of the spouse in the practice were the predictor variables.

Table 5 contains the regression analysis results. The stepwise regression model included only those variables which had F-to-enter ratios with probabilities less than .10. The multiple regression analyses revealed that four variables, stressors, avoidance coping, hardiness, and social support, were significant predictors of strain, accounting for 32% of its variance. The regression estimate for stressors indicates that dentists who differ by 1 point in stressors, but are equivalent on all other variables, would be expected to differ by .43 points on strain. Similar interpretations can be applied to each of the other variables shown in Table 5.

Although the role of the spouse in the practice was the only demographic variable which stayed in the model (based on a value of .10 to enter the model or be deleted from the model), it should be noted that its predictive value was only marginally significant ($p = .09$). These results indicate that stressors, avoidance coping, hardiness, social support, and role of the spouse in the practice (to a lesser extent) were the set of variables taken together that provided optimum predictive accuracy for strain in male dentists.

Table 5

Stepwise Regression Analysis of the Relationship Between Strain and the Predictor Variables

Parameter	Estimate	SE	F	p
Intercept	75.29			
Stressors	.43	.09	22.71	.0001
Avoidance Coping	2.41	.74	10.53	.001
Hardiness	-.29	.11	7.73	.006
Social Support	-.29	.12	5.48	.02
Role of Spouse	-1.56	.93	2.81	.09

$F(5,218) = 20.98$, $p < .0001$, $r^2 = .32$

Research Question Four

The fourth research question dealt with whether demographics, stressors, hardiness, coping style, social support, and health practices relate to the level of career and general life satisfaction in male dentists. This question was answered using two stepwise multiple regression analyses, one with career satisfaction as the criterion variable and one with general life satisfaction as the criterion variable.

Each stepwise multiple regression analysis added to the regression equation the predictor variable that most significantly related to the independent variable (with any variance shared with other predictor variables in the equation partialled out) until none of the remaining predictor variables added significantly to the regression equation. The resultant equation contained only the predictor variables that significantly entered the regression equation.

Career satisfaction. Table 6 contains the regression analysis data for career satisfaction. The five variables of income, religious preference, frequency of staff meetings, active-behavioral coping, and hardiness were the most optimum predictors of career satisfaction. This set of variables taken together accounted for 18% of the variance in career satisfaction. The regression estimate for income

Table 6

Stepwise Regression Analysis of the Relationship Between Career Satisfaction and the Predictor Variables

Parameter	Estimate	SE	F	p
Intercept	11.65			
Income	.60	.16	13.38	.0003
Religious Preference	-1.04	.32	10.35	.002
Frequency of Staff Meetings	.39	.17	5.40	.02
Active-Behavioral Coping	.39	.17	5.29	.02
Hardiness	.06	.03	3.99	.05

$F(5,209) = 9.20$, $p < .0001$, $r^2 = .18$

indicates that dentists who differ by 1 point in income, but are equivalent on all other variables, would be expected to differ by .60 points on career satisfaction. Likewise, dentists who differ by 1 point in hardiness, but are equivalent on all other variables, would be expected to differ by .06 points in career satisfaction. Similar interpretations can be applied to each of the other variables shown in Table 6.

These results indicate that it was the demographic variables of income, religious preference, and frequency of staff meetings as well as active-behavioral coping and hardiness which were the most optimum set of variables for predicting career satisfaction in the male dentists in the study.

Life satisfaction. The five variables of hardiness, social support, health practices, stressors, and role of spouse were significant predictors of life satisfaction, accounting for 44% of its variance. A summary of the multiple regression analysis is presented in Table 7. The regression estimate for hardiness indicates that dentists who differ by 1 point in hardiness, but are equivalent on all other variables, would be expected to differ by .09 points on life satisfaction. Similar interpretations can be applied to each of the other variables in Table 7.

These results mean that life satisfaction in the male dentists in this study was most optimally predicted by the set of variables including hardiness, social support, health

Table 7

Stepwise Regression Analysis of the Relationship Between Life Satisfaction and the Predictor Variables

Parameter	Estimate	SE	F	p
Intercept	1.31			
Hardiness	.09	.01	39.05	.0001
Social Support	.08	.02	20.86	.0001
Health Practices	.06	.02	6.90	.009
Stressors	-.03	.01	4.25	.04
Role of Spouse	.27	.13	4.13	.04

$F(5,210) = 33.40$, $p < .0001$, $r^2 = .44$

practices, involvement of the spouse in the practice, and stressors.

Intercorrelations. It must be noted that several of the predictor variables were found to correlate with the criterion variables. Intercorrelations among all the continuous predictor and criterion variables are presented in Table 8.

Strain was significantly positively correlated with stressors and avoidance coping, and significantly negatively correlated with hardiness, social support, and health practices. These correlation coefficients ranged from .37 to -.42. Career satisfaction was significantly positively correlated with hardiness, active-behavioral coping, active-cognitive coping, and social support, while it was significantly negatively correlated with stressors. These correlation coefficients ranged from .24 to -.15. Life satisfaction was significantly positively correlated with hardiness, social support, health practices, active-behavioral coping, and active-cognitive coping, whereas it was significantly negatively correlated with stressors and avoidance coping. These correlation coefficients ranged from .58 to -.34.

The correlation matrix reveals that many variables are significantly highly correlated with each other and could explain why certain variables did not enter the regression equations, because they also correlated with one or more of

Table 8

Correlation Matrix Intercorrelations Among All Continuous Predictor and Criterion Variables

		1	2	3	4	5	6	7	8	9	10	11	12
1.	Age	-	.95^{+}	-.18$^{@}$	.03	-.05	.07	-.09	.08	.05	-.05	.07	.16$^{@}$
2.	Years in Practice		-	-.19$^{@}$	.03	-.04	.06	-.09	.10	.08	-.05	.07	.14*
3.	Stressors			-	-.33^{+}	.09	-.02	.20$^{@}$	-.17$^{@}$	-.11	.37^{+}	-.15*	-.28^{+}
4.	Hardiness				-	.09	.15*	-.38^{+}	.35^{+}	.35^{+}	-.42^{+}	.24$^{@}$	.58^{+}
5.	Active-Cognitive Coping					-	.32^{+}	-.02	.28^{+}	.19$^{@}$	-.00	.13*	.16*
6.	Active-Behavioral Coping						-	-.05	.32^{+}	.23$^{@}$	-.08	.16*	.18$^{@}$
7.	Avoidance Coping							-	-.24^{+}	-.38^{+}	.36^{+}	-.10	-.34^{+}
8.	Social Support								-	.31^{+}	-.28^{+}	.15*	.45^{+}
9.	Health Practices									-	-.28^{+}	.11	.37^{+}
10.	Strain										-	-.07	-.40^{+}
11.	Career Satisfaction											-	.35^{+}
12.	Life Satisfaction												-

$^{*}p < .05$, $^{@}p < .01$, $^{+}p < .0001$

the other variables and thus did not add significant predicting power to the equation.

Research Question Five

Research question five concerned the significance of individual variables, hardiness, coping style, social support, and health practices (which have been referred to as mediating variables), in the stressors-strain/satisfaction relationship among male dentists. Because this is a model building question a series of simple linear regressions were done (with each of the three criterion variables of strain, career satisfaction, and life satisfaction), adding stressors first, then each of the variables were added one at a time (based on both a theoretical order. The first regression equation used one predictor variable, the next regression equation used two, and at each step another single variable was added to the regression (model) equation, until all seven variables had been added. Then a test of complete versus reduced models was performed to determine which model provided both the most parsimonious model and the greatest predictive value.

Strain. The first step in model building with strain as the criterion variable was a very simple regression equation with stressors predicting strain. This equation accounted for 14% of the variance in strain, $r^2 = .14$. Then hardiness was added to the model which increased the r^2 to .24, indicating stressors plus hardiness accounted for

24% of the variance in strain. The third step was to add avoidance coping to the model which in turn increased the r^2 to .28, which indicated that stressors, hardiness, and avoidance coping taken together accounted for 28% of the variance in strain. When the variable health practices was added at the fourth step the r^2 remained at .28, as it did when social support was added to the equation at the fifth step. At the sixth step, active-behavioral coping was added to the model and the r^2 increased to .29, indicating that active-behavioral coping taken together with the previously mentioned variables accounted for 29% of the variance in strain.

The model which had three variables in it is contained in Table 9. These results indicate that hardiness and avoidance coping were the variables which, taken together with stressors, provided the optimum predictive accuracy for strain in male dentists in this sample.

Career satisfaction. The first step in model building with career satisfaction as the criterion variable was the simple regression equation with stressors predicting career satisfaction. This equation accounted for 2% of the variance in career satisfaction, $r^2 = .02$. Then hardiness was added to the model which increased the r^2 to .06, indicating stressors plus hardiness accounted for 6% of the variance in career satisfaction. The third step was to add active-behavioral coping to the model, which in turn increased the r^2 to .08. As social support was added, the r^2 became .07.

Table 9

Simple Linear Multiple Regression Analysis of the Relationship Between Stressors With the Mediating Variables and Strain

Parameter	Estimate	SE	T	p
Intercept	75.71			
Stressors	.37	.09	4.27	.0001
Hardiness	-.42	.10	-4.28	.0001
Avoidance Coping	2.60	.73	3.57	.0004

$F(3,245) = 31.32$, $p < .0001$, $r^2 = .28$

Table 10 contains a summary of the linear regression analysis containing the three variables stressors hardiness, and active behavioral coping which provided optimum predictive accuracy for career satisfaction for this sample. It should be noted however that the variable stressors had a probability less than .05; hence, it did not make a significant contribution. Overall, the strength of this prediction equation is rather weak, accounting for only 8% of the variance in career satisfaction, leaving 92% unexplained. These results reveal that the hardiness and active-behavioral relationship coping taken with stressors provide optimum predictive accuracy for career satisfaction in male dentists in this study.

Life satisfaction. As with the other models, the first step was the simple regression equation of stressors predicting life satisfaction. This equation resulted in an r^2 of .08, indicating stressors accounts for 8% of the variance in life satisfaction. Then hardiness was added to the model and increased the r^2 to .34 and accounted for 34% of the variance in life satisfaction. At step three, social support was added to the model accounting for 40% of the variance in life satisfaction, $r^2 = .40$. As health practices was added to the model the r^2 increased again to .42, indicating that health practices together with stressors, hardiness, and social support accounted for 42% of the variance in life satisfaction. The next step added

Table 10

Simple Linear Regression Analysis of the Relationship Between Stressors With the Mediating Variables and Career Satisfaction

Parameter	Estimate	SE	T	p
Intercept	11.98			
Stressors	-.03	.03	-1.32	.19
Hardiness	.08	.03	2.88	.004
Active-Behavioral Coping	.36	.17	2.06	.04

$F(3,245) = 6.91$, $p < .0002$, $r^2 = .08$

the fifth variable, avoidance coping, to the model and the r^2 stayed the same, .42.

A summary of the linear regression analysis which provided the optimum predictive accuracy for life satisfaction is presented in Table 11. These results indicate that in male dentists life satisfaction is optimally predicted by stressors, hardiness, social support, and health practices. owever, the variable stressors had a probability less than .05; hence, it did not make a significant contribution.

Discussion

The results of this study indicate that male dentists had on the average been in practice 19 years, were 46 years old, white, married, and general practitioners in solo practice. This profile matches very closely the description of dentists across the state of Florida (Office of Regulation and Health Facilities, 1987) as well as the Texas dentists described by Katz (1981).

The dentists' mean score of 39.80 on stressors or perceived demands was below the 50th percentile (45), which is consistent with findings from a previous study (Katz, 1981). Their mean hardiness score was 71.58 (SD = 8.52) which compares favorably to the male norm mean of 76.63 (SD = 9.29). The dentists reported 85% use of active-cognitive coping, 56% use of active-behavioral coping, and only 33%

Table 11

Simple Linear Regression Analysis of the Relationship Between Stressors With the Mediating Variables and Life Satisfaction

Parameter	Estimate	SE	T	p
Intercept	1.13			
Stressors	-.02	.01	-1.83	.07
Hardiness	.10	.01	6.86	.0001
Social Support	.08	.02	4.72	.0001
Health Practices	.06	.02	2.59	.01

$F(4,233) = 41.79$, $p < .0001$, $r^2 = .42$

use of avoidance coping. Their high use of desirable coping styles (active-cognitive and active-behavioral) and relatively low use of avoidance coping confirms the findings of Pearlin and Schooler (1978), that men, the educated, and the affluent make greater use of the efficacious coping mechanisms. The dentists' use of social support was desirably high (M = 30.01), as was health practices (M = 32.36), both on a 40 point scale. These findings support the idea proposed by Ayer and Moretti (1985) that dentists may not be as vulnerable to stress because they have learned or have available to them relatively appropriate and effective resources for dealing with stressors.

The results of this study also indicate that male dentists in this study reported fairly low levels of strain. This sample scored almost a full standard deviation below the norm provided by the authors of the instrument to measure strain (Lefebvre & Sandford, 1985). This low score was consistent over all three dimensions (physical, behavioral, and cognitive) measured by the test. This finding supports the view proposed by Ayer and Moretti (1985) that dentistry may not be as stressful as the public has been led to believe. Conversely, the relatively low levels of strain in dentists raise a question about the norms for the Strain Questionnaire (SQ). The instrument was normed with undergraduate and graduate students, naval engineers, teachers, and insurance agents enrolled in stress management classes. Is the norm group truly representative

of the population as a whole? If they are, do dentists truly and accurately really have low levels of strain?

Participants also reported fairly high levels of satisfaction. For career satisfaction, their mean score was 17.75, which was just below the 50th percentile (18) and is comparable to the findings of Katz (1981). For life satisfaction, the dentists' scores were consistent with the norms provided by the authors of the instrument (Campbell et al., 1976).

In summary, the dentists in this study can be described as having moderate levels of stressors and resulting strain, moderate hardiness, moderate to high levels of social support and health practices, and predominantly using effective (active-cognitive and active-behavioral) coping styles and using few ineffective (avoidance) coping styles. They also may be described as moderately satisfied with their careers and rather highly satisfied with life in general.

Significant differences did exist among male dentists by demographic characteristics regarding their stressors, hardiness, coping style, social support, and health practices, as well as levels of strain, career satisfaction, and life satisfaction. However, a cautionary note should be added that because of the large number of one-way analyses of variance several of these significant relationships could be due to chance alone; however, it is not possible to know which occurred by chance. The findings indicated that

dentists with a Protestant religious preference reported significantly higher career satisfaction and social support than did dentists reporting a Jewish religious preference. This finding was quite curious and as such unexplainable. Religious preference has never been studied in relation to any of these variables before, so further research investigating reltion as a stress resistance resource is warranted.

It is not surprising that married dentists reported significantly higher life satisfaction than non-married dentists. This finding supports the conclusions of Yablon and Mayhew (1984) that dentists who were married rather than single tended to be more satisfied. Results also indicated that dentists who practice with someone else rather than alone used more active-behavioral coping and health practices. As expected, general dentists experienced significantly higher stressors (demands) than did the specialists. This finding is consistent with past research (Dunlap & Stewart, 1982; Katz, 1981; Russek, 1962) indicating that general practitioners find dentistry much more stressful than do specialists.

The number of days of continuing education courses taken per year was significantly related to increases in active-behavioral coping and higher hardiness. Results also showed that dentists with higher incomes were more satisfied with their careers, which is consistent with previous

research (George & Milone, 1982; Katz, 1987; Yablon & Mayhew, 1984).

Dentists with fewer years in practice reported significantly higher stressors and lower life satisfaction. These findings are supported by previous research. Dunlap and Stewart (1982) found dentists with fewer years in practice reported higher stress, while Yablon and Rosner (1982) reported a general trend toward increased overall satisfaction with increasing age.

The data indicated dentists who have regular staff meetings reported higher career satisfaction, life satisfaction, hardiness, and health practices, as well as significantly less cognitive strain and marginally significant more social support than dentists who rarely meet with their staffs. These results are consistent with previous research (Katz, 1981) which have linked frequency of staff meetings to career satisfaction.

The role of the spouse in the practice was significantly related to life satisfaction, hardiness, cognitive strain, avoidance coping, and strain. The dentists with "lots" of involvement from their spouses scored significantly better on these measures than did dentists with no involvement from their spouses. Dentists with "some" involvement by their spouse reported significantly more active-behavioral coping than dentists with no involvement of the spouse in the practice. However, the dentists with "lots" of involvement from their spouses

also reported significantly higher stressors than the dentists with "some" involvement from their spouses. This finding is congruent with previous research. Katz (1981) reported that high level of involvement of the spouse in the dentist's practice was significantly related to stressors. Apparently the involvement of the spouse in the practice is critically important on many measures, but lots of involvement can create a higher level of stressors (or demands) on the dentist.

Strain in male dentists was significantly predicted by stressors, avoidance coping, hardiness, social support, and role of the spouse in the practice. None of the other variables ehanced the predictability of strain. The predictive relationship between stressors and strain was expected from previous research (Holmes & Rahe, 1967; Shinn et al., 1984) as well as the high intercorrelation between the two variables. The role of the spouse was a marginally significant negative predictor of strain. Avoidance coping, such as smoking more or keeping one's feelings to oneself, was found to positively predict strain, whereas the other two forms of coping did not enhance the prediction of strain. This finding is consistent with research done by Billings and Moos (1981) in which the authors found that avoidance coping was significantly related to depression, anxiety, and physical symptoms and was more highly related to these criteria than the other two methods of coping.

Hardiness was found to be a negative predictor of strain, which supports the research done by Kobasa and her colleagues (e.g., Kobasa, 1979). Social support was positively predictive of reducing strain which is consistent with the large body of literature which demonstrates that social support has a positive effect on physical and psychological health. However, this finding is inconsistent with two studies (Hammond, 1987; Kobasa, 1982) which did not find a significant relationship between social support in reducing strain in male academics and lawyers, respectively.

Career satisfaction in male dentists was most optimally predicted by the demographic characteristics of income, religious preference, and frequency of staff meetings. The variables of active-behavioral coping and hardiness also added to the prediction of career satisfaction; however, not as strongly as the demographic variables. The value of income and frequency of staff meetings as predictors of career satisfaction can be linked to the previous discussion as well as research previously cited. Although the negative relationship of religious preference to career satisfaction is strong, it is unique and cannot be tied to any previous research; as such it is difficult to explain. The finding of the significance of hardiness in predicting career satisfaction is supported by Hammond's (1987) research on male academic multiple role persons, while the result of active-behavioral coping was inconsistent with the findings in that study, which found a significant predictive

relationship between active-cognitive coping and career satisfaction in men.

Life satisfaction in male dentists was most significantly predicted by the set of variables which included hardiness, social support, health practices, stressors, and role of the spouse in the practice. The strongly significant ($p < .0001$) predictive value of hardiness and social support to life satisfaction in men is consistent with previous research (Hammond, 1987). However, unlike Hammond's study, this study also revealed the lesser significance of health practices, stressors, and role of the spouse in predicting life satisfaction. Interestingly the value of the set of predictor variables in predicting life satisfaction was much stronger than for career satisfaction, as reflected in the r^2 values of .44 and .18, respectively. For career satisfaction the demographic characteristics were more powerful predictors than active-behavioral coping or hardiness.

Results of the model building to determine the role of hardiness, coping style, social support, and health practices into the prediction of stressors to strain revealed hardiness and avoidance coping were significant predictors. This could be interpreted to mean that hardiness may significantly reduce one perception of stressors and hence lower resulting strain. However, use of avoidance coping may have the opposite effect. Increased use of avoidance coping in response to stressors correspondingly increases the level of strain. These

findings are consistent with the research of Hammond (1987), who found that hardiness and avoidance coping were the most significant predictors of stress (strain) in men. What is uniquely different about the results of this study is that stress was measured both as a predictor variable in the form of stressors and as a criterion variable in the form of strain.

Results of the model building to determine the mediating role of hardiness, coping style, social support, and health practices between stressors and career satisfaction revealed hardiness and active-behavioral coping were the most optimum predictors. These findings are consistent with Hammond's (1987) about the strong ($p < .0001$) predictive value of hardiness to career satisfaction in men. Overall the prediction value of the variables is very weak as revealed by the low levels of significance ($p = .18, .02$, and $.06$) and the r^2 of .07. This leaves 93% of the variance in career satisfaction unexplained.

Results of the model building to determine the mediating role of hardiness, coping style, social support, and health practices between stressors and life satisfaction revealed hardiness, social support, and health practices were the most optimum set of predictors, and avoidance coping was a much less significant predictor ($p = .24$). The findings are very similar to the Hammond (1987) study, which found hardiness, social support (from family), and avoidance coping were significant predictors of life satisfaction in

men. The strength of this model is quite powerful as reflected in the r^2 value of .42, which means this model with stressors and the significantly predictive other variables accounts for 42% of the variance in life satisfaction in male dentists. What is uniquely different about this study is that stressors were considered first as the only predictor of life satisfaction, then in combination with the other variables.

CHAPTER V
CONCLUSIONS, IMPLICATIONS, SUMMARY, AND RECOMMENDATIONS

Conclusions

Based on the results of this study, the following conclusions were drawn:

1. Male dentists in this study were predominantly white, married, general practitioners in solo practice. Their average age was 46 years and the average years in practice was 19 years. The dentists reported moderate levels of stressors, strain, and hardiness, and moderate to high levels of social support and health practices. They used predominantly effective coping styles. They also reported moderate career satisfaction and moderate to high life satisfaction.

2. Male dentists in this study differed by demographic characteristics according to stressors, hardiness, coping styles, social support, health practices, strain, career satisfaction, and life satisfaction. Dentists with fewer years in practice showed higher stressors and less life satisfaction, while dentists with more years in practice had lower stressors and higher life satisfaction. Married dentists reported higher life satisfaction than the unmarried dentists. Protestant dentists reported higher

levels of social support and career satisfaction than did dentists with a Jewish religious preference. Dentists in the higher income group had higher career satisfaction than dentists in the lower income group. Dentists who practiced with someone else used more active-behavioral coping and health practices than solo practitioners. General practice dentists had higher stressors than did the specialists. Dentists who had regular staff meetings reported higher career satisfaction, life satisfaction, hardiness, health practices, and social support and less cognitive strain than dentists who rarely met with their staffs. The number of days of continuing education courses taken per year was significantly related to both active-behavioral coping and hardiness. The role of the spouse in the practice was significantly related to stressors, hardiness, coping style, strain, and life satisfaction.

3. Stressors, avoidance coping, hardiness, and social support are the set of variables which, when taken together, provided the optimum predictive accuracy of the level of strain in the male dentists in this study.

4. Income, religious preference, frequency of staff meetings, active-behavioral coping, and hardiness were the set of variables which, when taken together, provided the optimum predictive accuracy of career satisfaction in male dentists in this study. However, hardiness, social support, health practices, stressors and role of the spouse in the

practice are the optimum set of variables for predicting life satisfaction in male dentists in this study.

5. Hardiness and avoidance coping serve as the best predictor variables in the stressor-strain relationship among male dentists. Hardiness and active-behavioral coping serve as the best predictor mediator variables in the stressor-career satisfaction relationship among male dentists. Hardiness, social support, and health practices serve as the best predictor variables in the stressors-life satisfaction relationship among male dentists.

Implications

The results of this study have important applications for theory, practice, and training. In the theory area, this study contributes to the stress research literature in two important ways: first, by extending to a new population group the application of the transactional model as described by Lazarus and Folkman (1984). Secondly, this study is perhaps the first study which has examined the relationships of a broad range of variables from the transactional model within the same study.

Another implication of this study relates to research findings concerning strain and satisfaction in male dentists. While this study validated the findings of previous researchers, several new findings are of particular interest. Perhaps the most significant is that male

dentists did not report high levels of strain. Another new finding was that many of the demographic characteristics are better predictors of career satisfaction among male dentists and a second was the relationship of religious preference and career satisfaction in male dentists. The question of religion as a stress resistance resource deserves further investigation.

Another implication of this study concerns the practice of dentistry. There are specific things that male dentists can do within their practices that may reduce their strain and increase their satisfaction. Specifically the involvement by the spouse in the practice and having regular staff meetings can help dentists in this regard.

There are implications in the area of training for both dentists and counselors. The dentists' participation in continuing education was related to improved levels of hardiness and coping styles which in turn related to reduced strain and satisfaction. Although a direct relationship can not be concluded an implied relationship is certainly evident. Hence specific skill building sequences in the dental school curriculum as well as continuing education courses for practicing dentists may be very beneficial. The results of this study may also be helpful in training counselors who are interested in working with professional groups such as dentists.

Summary

The purpose of this study was to describe stress and the role of stress resistance resources in male dentists. Specifically, using the transactional model of stress, the relative mediating effects of hardiness, coping style, social support, and health practices in the stressors-strain/satisfaction relationship in male dentists were explored. The statement of the problem, purpose of the study, need for the study, significance of the study, definition of terms, and organization of the study were discussed in Chapter I.

The literature related to stress, stress in dentistry, satisfaction, and the mediator variables in the stress process was reviewed in Chapter II. The sections included under stress were a historical overview, theoretical models of stress, and measurement techniques. The sections included under stress in dentistry were stressors in the practice of dentistry and the stress response in dentists. The sections included under satisfaction were theories of satisfaction and career satisfaction of dentists. The sections included under the mediator variables in the stress process were hardiness, coping, social support, health practices, and exercise.

The research questions, population and sample, instruments, data collection, data analyses, and limitations of the study were described in Chapter III.

The results and a discussion of the results were presented in Chapter IV. The findings of this study indicated that male dentists reported moderate levels of stressors, strain, and hardiness, and moderate to high levels of social support and health practices. Male dentists used predominantly effective coping styles and reported moderate career satisfaction and moderate to high life satisfaction. Differences did exist between male dentists on certain demographic variables (i.e., years in practice, role of spouse, days of continuing education, frequency of staff meetings, type of practice, religious preference, income, and marital status) and the other measures (stressors, hardiness, coping style, social support, health practices, strain, and career and life satisfaction). Regression analyses showed that strain was optimally predicted by the variables of stressors, avoidance coping, hardiness, and social support.

Career satisfaction was optimally predicted by income, religious preference, frequency of staff meetings, active-behavioral coping, and hardiness. Hardiness, social support, health practices, stressors, and role of the spouse were the set of variables taken together that provided optimum predictive accuracy of life satisfaction in male dentists in this sample. Hardiness and avoidance coping served as mediator variables in the stressor-strain relationship. Hardiness and active-behavioral coping served as mediator variables in the stressor-career satisfaction

relationship. Hardiness, social support, and health practices served as mediators in the stressors-life satisfaction relationship.

Recommendations for Future Research

Based on the results of this study, the following research studies are suggested:

1. A study should be conducted to determine the differences between dentists with high and low levels of strain. It could be conducted with a similar population, divided into two equal groups by high and low strain, and the differences in the role of the mediating variables between the two groups could be compared.

2. A research study is needed which includes female dentists, to determine if there are gender differences which may affect the relationships between the variables.

3. A research study is needed to investigate the importance of religion as a stress resistance resource and the relationship of religion to career and life satisfaction.

4. A research study is needed which tests for the interaction among variables in the regression model; in this way the mediating effects of the stress resistance resources can be investigated.

5. A research study is needed to take the results of this descriptive study one step further. Since the relationships have been established, an exploration of why

these relationships exist is in order. Perhaps a descriptive study using a structured interview format, an experimental study, or a time lapsed study with pre- and post-measures could more effecitvely answer these questions.

6. A research study should be conducted to compare dentists' strain, satisfaction, and stress-resistance resources with other professional groups such as physicians and lawyers.

7. A replication study of this research should be conducted to examine the reliability of these findings. Replication should be conducted under conditions approximately equivalent to this study. Replication studies that vary the occupational group or the gender could provide useful information as to whether the results of this study are unique to dentists or whether they are generalizable in scope.

APPENDIX A
INSTRUMENTS

DENTAL STRESS INDEX

Using a 1-5 scale, please indicate how stressful you find each of the following for you in the practice of dentistry.

	NOT STRESSFUL AT ALL	1----5	VERY STRESSFUL

1 ____ Time pressures

2 ____ Financial concerns

3 ____ Dealing with anxious patients

4 ____ Lack of patient appreciation

5 ____ Lack of acceptance of treatment plans

6 ____ Personnel management

7 ____ Business management/paper work

8 ____ Inflicting pain

9 ____ Lack of patient cooperation

10 ____ Problems with laboratories

11 ____ Dealing with third party payment plans

12 ____ Repetition/boredom of work

13 ____ Daily confinement to office

14 ____ Isolation from professional peers

15 ____ Overall, how stressful do you find the practice of dentistry?

DENTAL CAREER SATISFACTION INDEX

Next, I would like to get your indication of how you feel about the practice and profession of dentistry. Please rate on a 1-5 scale how strongly you feel about each of the following questions.

1 ____ Overall, how happy would you say you feel about being a dentist?

VERY UNHAPPY 1----5 EXTREMELY HAPPY

2 ____ To what extent would you encourage your son or daughter to become a dentist?

WOULD STRONGLY DISCOURAGE 1----5 WOULD STRONGLY ENCOURAGE

3 ____ If you had it to do over again, knowing what you do now, how likely would it be that you would choose dentistry for your career?

HIGHLY UNLIKELY 1----5 HIGHLY LIKELY

4 ____ To what extent have you seriously considered leaving private practice for some other form of dentistry such as teaching or public health?

HAVE NOT CONSIDERED AT ALL 1----5 HAVE VERY SERIOUSLY CONSIDERED

5 ____ To what extent have you seriously considered leaving the profession of dentistry for some other profession or occupation?

HAVE NOT CONSIDERED AT ALL 1----5 HAVE VERY SERIOUSLY CONSIDERED

6 ____ Overall, how successful do you feel you are in your profession when compared to the average dentist?

VERY UNSUCCESSFUL 1----5 VERY SUCCESSFUL

GENERAL LIFE SATISFACTION

Here are some words and phrases which I would like you to use to describe how you feel about your life at the present. For example, if you think your life is very "boring," put an "X" in the box next to the word "boring." If you think it is very "interesting," put an "X" in the box right next to the word "interesting." If you think it is somewhere in between, put an "X" where you think it belongs. Put an "X" in one box on every line.

BORING	☐	☐	☐	☐	☐	☐	☐	INTERESTING
ENJOYABLE	☐	☐	☐	☐	☐	☐	☐	MISERABLE
USELESS	☐	☐	☐	☐	☐	☐	☐	WORTHWHILE
FRIENDLY	☐	☐	☐	☐	☐	☐	☐	LONELY
FULL	☐	☐	☐	☐	☐	☐	☐	EMPTY
DISCOURAGING	☐	☐	☐	☐	☐	☐	☐	HOPEFUL
DISAPPOINTING	☐	☐	☐	☐	☐	☐	☐	REWARDING
BRINGS OUT THE BEST IN ME	☐	☐	☐	☐	☐	☐	☐	DOESN'T GIVE ME MUCH CHANGE

How satisfied are you with your life as a whole these days?

COMPLETELY DISSATISFIED	☐	☐	☐	☐	☐	☐	☐	COMPLETELY SATISFIED

COPING RESPONSES

Think of a typical problem you have recently faced in your work as a dentist. How did you deal with this problem? Please read each statement below and circle "YES" if you did the action described or "NO" if you did not.

YES NO 1. Tried to see the positive side.

YES NO 2. Tried to step back from the situation and be more objective.

YES NO 3. Prayed for guidance or strength.

YES NO 4. Took things one step at a time.

YES NO 5. Considered several alternatives for handling the problem.

YES NO 6. Drew on my past experiences.

YES NO 7. Tried to find out more about the situation.

YES NO 8. Talked with a professional person (e.g., doctor, clergy, lawyer) about the situation.

YES NO 9. Took some positive action.

YES NO 10. Talked with my spouse or other relative about the problem.

YES NO 11. Talked with a friend about the situation.

YES NO 12. Exercised more.

YES NO 13. Prepared for the worst.

YES NO 14. Sometimes took it out on other people when I felt angry or depressed.

YES NO 15. Tried to reduce the tension by eating more.

YES NO 16. Tried to reduce the tension by smoking more.

YES NO 17. Kept my feelings to myself.

YES NO 18. Got busy with other things in order to keep my mind off the problem.

YES NO 19. Didn't worry about it; figured everything would probably work out fine.

DEMOGRAPHIC QUESTIONNAIRE

Finally, I would like to ask some questions about you and your practice to help interpret the results. Please circle one number which represents the best answer to each question.

Age _____ Years in practice _____

Sex
1 = MALE
2 = FEMALE

Race
1 = BLACK 2 = HISPANIC
3 = WHITE 4 = OTHER

Marital status
1 = NEVER MARRIED 2 = MARRIED
3 = SEPARATED 4 = DIVORCED
5 = WIDOWED

Religious preference
1 = CATHOLIC 2 = PROTESTANT
3 = JEWISH 4 = ISLAMIC
5 = OTHER 6 = NONE

Specialty
1 = GENERAL DENTISTRY
2 = ORTHODONTICS
3 = PREDODONTICS
4 = PERIODONTICS
5 = ENDODONTICS
6 = ORAL SURGERY
7 = PROSTHODONTICS

Type of practice
1 = SOLO PRACTICE
2 = ASSOCIATESHIP
3 = PARTNERSHIP
4 = GROUP PRACTICE
5 = CLINIC
6 = MILITARY
7 = PUBLIC HEALTH
8 = DENTAL EDUCATION

Annual income
1 = LESS THAN $50,000
2 = $51,000-$75,000
3 = $76,000-$100,000
4 = $101,000-$150,000
5 = $151,000-$200,000
6 = MORE THAN $200,000

Days of continuing education courses taken per year

1 = 1-5
2 = 6-10
3 = 11-15
4 = 16-20
5 = OVER 20

Average frequency of staff meetings

1 = ALMOST NEVER
2 = OCCASIONALLY
3 = MONTHLY
4 = BI-WEEKLY
5 = WEEKLY
6 = DAILY

Role of your spouse in your practice (circle "1" if you are not married)

1 = NONE
2 = ADVISOR/CONSULTANT
3 = OCCASIONAL FILL-IN WORK
4 = PART-TIME STAFF MEMBER
5 = FULL-TIME STAFF MEMBER

APPENDIX B
COVER LETTERS FOR SURVEY QUESTIONNAIRE

July 20, 1988

Dear Doctor:

Countless articles appear in the professional literature and public press concerning the stresses dentists experience in their professional practices. These articles contain a great deal of speculation about the factors believed to contribute to dentists' stress. However, almost no systematic research has been carried out to determine, from the dentist's point of view, what contributes to their stress.

My name is Beth Klement. I am a Ph.D. candidate in Counselor Education at the University of Florida doing research on stress in dentistry and its ramifications. In addition to my academic interest in the topic, I have a personal interest because my husband, Tom, is a dentist. As his wife I see the everyday results of stress brought on by his dental practice.

You are one of a small number of dentists who are being asked to help us better understand the stress experienced by practicing dentists. Your name was randomly drawn, and, in order for this study to be truly representative, it is important that each questionnaire be completed and returned. I am enclosing a stamped, self-addressed envelope for your convenience.

You may be assured to complete confidentiality. The questionnaire has an identification number on it for mailing purposes only. This is so that I may cross your name off the mailing list when your questionnaire is returned. Your name will never be associated with your responses. In fact when the data collection phase is complete the code sheet linking your name with the questionnaire will be destroyed to protect your identity.

The results of this study can be an important contribution to furthering our understanding of the stresses experienced by dentists. If you wish, you may receive a summary of the results. Simply wirte "COPY OF RESULTS REQUESTED" on the back of the return envelope and print your name and address below it. Please DO NOT put this information on the questionnaire itself.

I would be most happy to answer any questions you might have about this study. Please write or call. The telephone number is (813)527-4053.

Thank you in advance for spending a few minutes of your valuable time assisting with this research endeavor.

Sincerely,

Beth Klement, Ed.S.
Researcher

Enclosures

July 20, 1988

Dr. David L. Kraus
10161 W. Sample Road
Coral Springs, FL 33065-3954

Dear Dr. Kraus:

Like you I am a practicing dentist and while I love my profession one of the biggest difficulties I deal with is stress. Stress caused by all the different roles I must play, frustration caused by lack of time, and my concern for quality work.

If you feel the way I do, please help add to research on stress related problems in dentistry. The attached material was compiled by Beth Klement, a Ph.D. candidate and dedicated person I have known for years. Her husband, Tom, is a practicing dentist in St. Petersburg so she has a personal interest and awareness about stress in dentistry.

This survey takes about 15 to 25 minutes to complete. The results can be an important contribution to our profession.

Sincerely,

Arnold S. White, Jr.
D.M.D., M.S.
Orthodontist

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BIOGRAPHICAL SKETCH

Elizabeth Cline Klement was born in Oak Ridge, Tennessee, May 14, 1952, to Lucile H. and Cranmore W. Cline. After graduating from high school in 1970, Beth attended the University of Florida where she graduated in 1974 with a Bachelor of Science in Journalism with a major in public relations.

As a graduate student, Beth held graduate assistantship positions in the University of Florida (UF) Admissions Office and the Counselor Education Department. In 1976, she received Master of Education and Specialist in Education degrees from the Counselor Education Department.

Beth then accepted a position as Residence Life Coordinator with the Division of Housing at UF. After one year, she was promoted to Assistant Director of Housing. She was employed at UF for three years from 1976 to 1979.

Beth then moved to St. Petersberg, Florida; married Thomas V. Klement, D.M.D.; and accepted a position as Training Administrator with Sperry Defense Electronics in 1980. In 1984, Beth was promoted to Supervisor for Management Training and Development. Beth was active in the Suncoast Chapter of the American Society for Training and Development and served as chapter treasurer and president.

After having two daughters, in 1983 and 1984, Beth resigned her position with Sperry in 1985 to become a full-time doctoral student. Her son was born in 1986.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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Professor of Counselor Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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